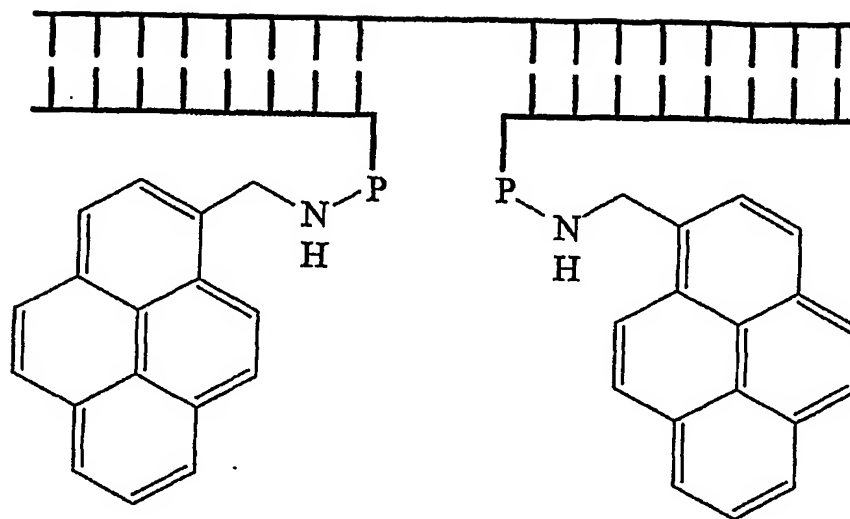
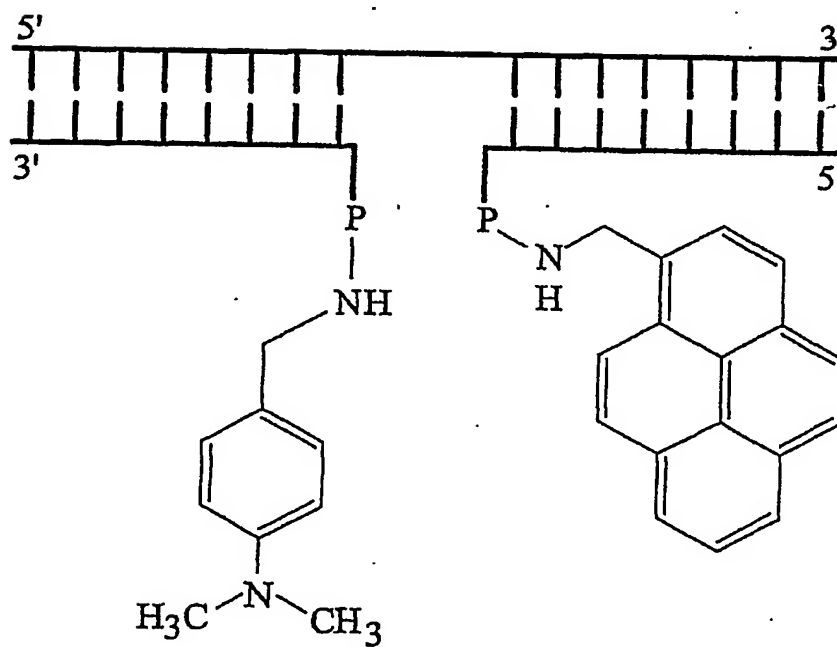


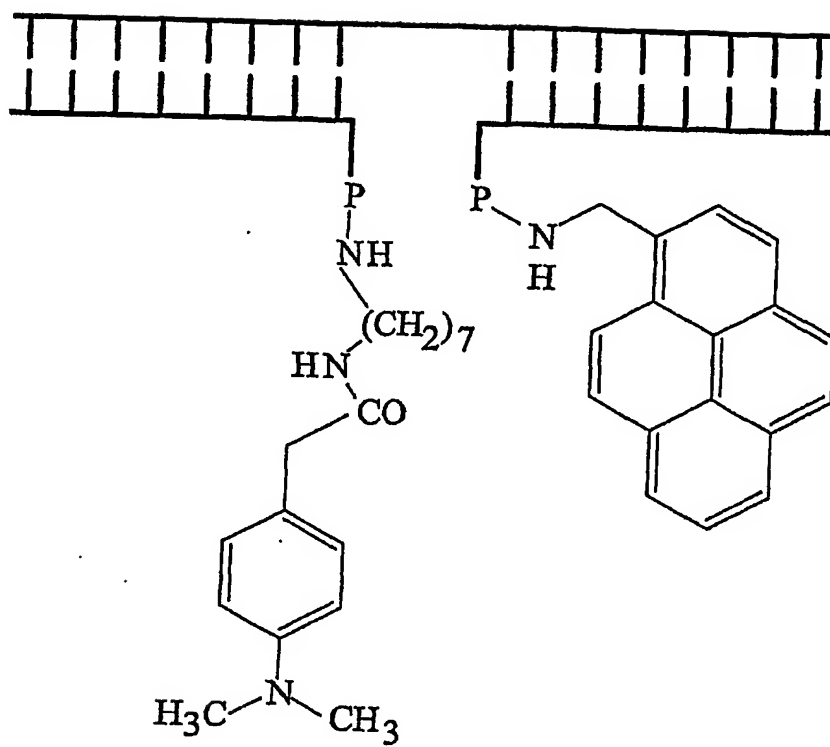
SP-1



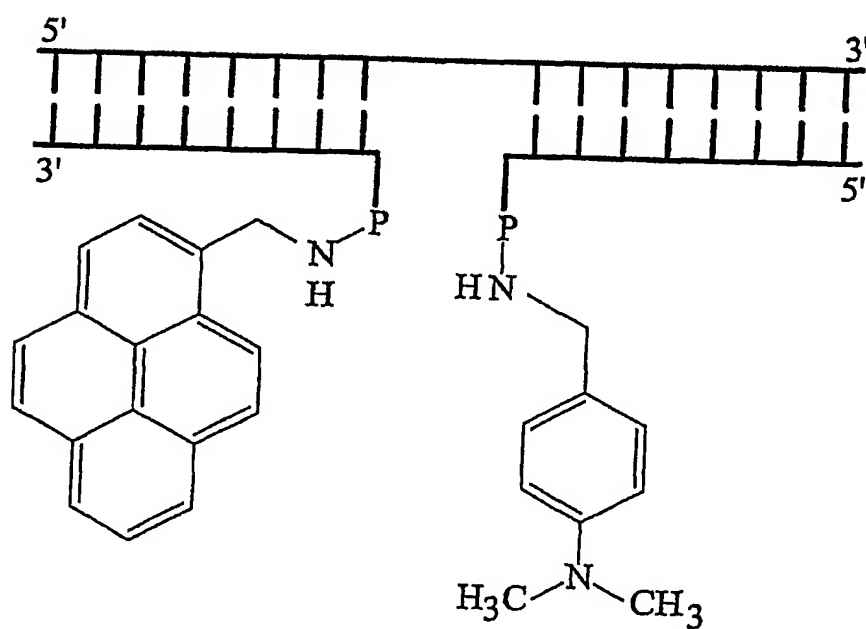
SP-2



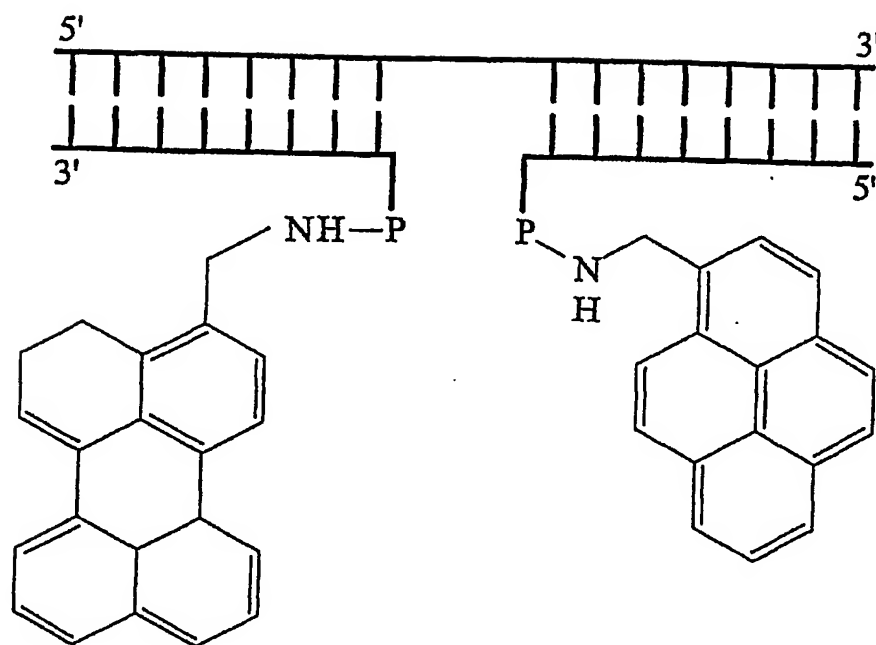
SP-3



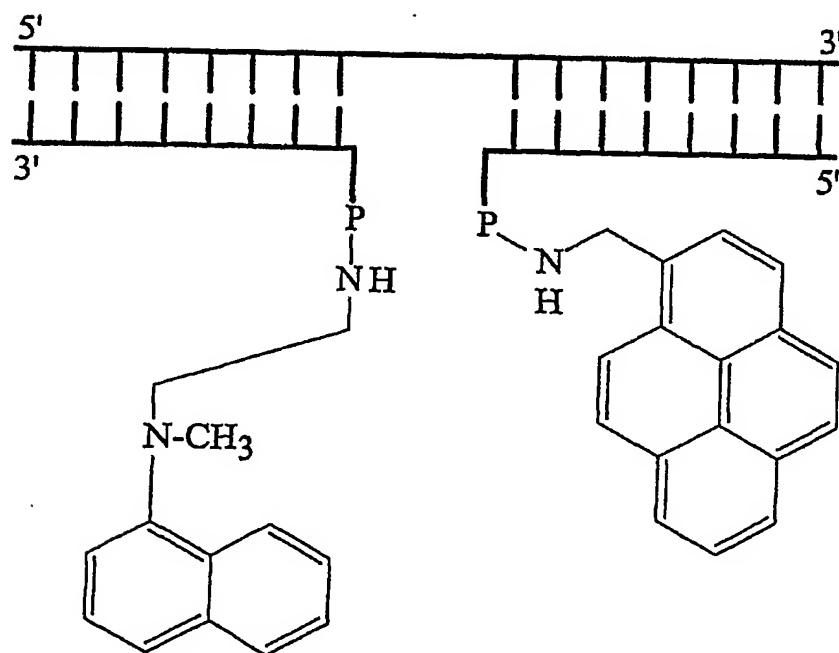
SP-4



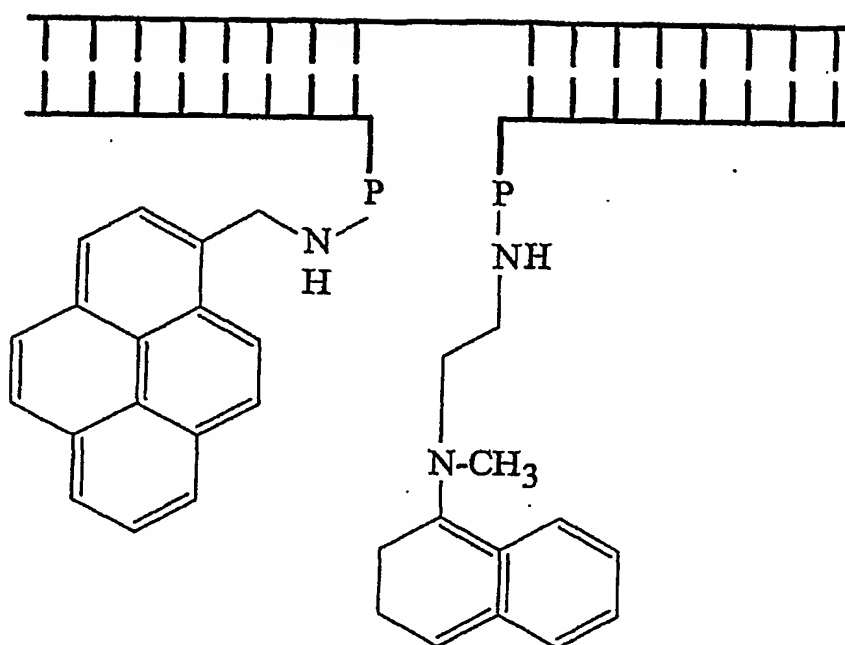
SP-17



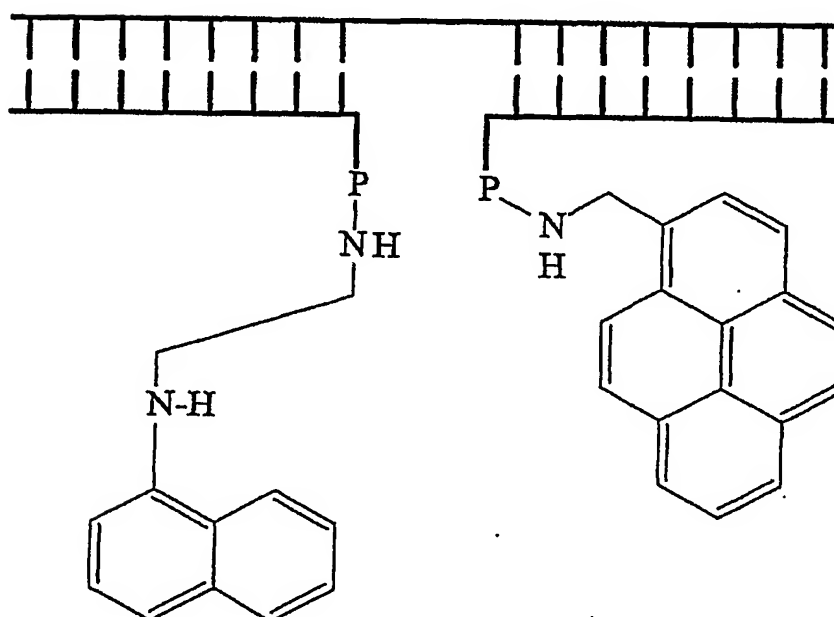
SP-18



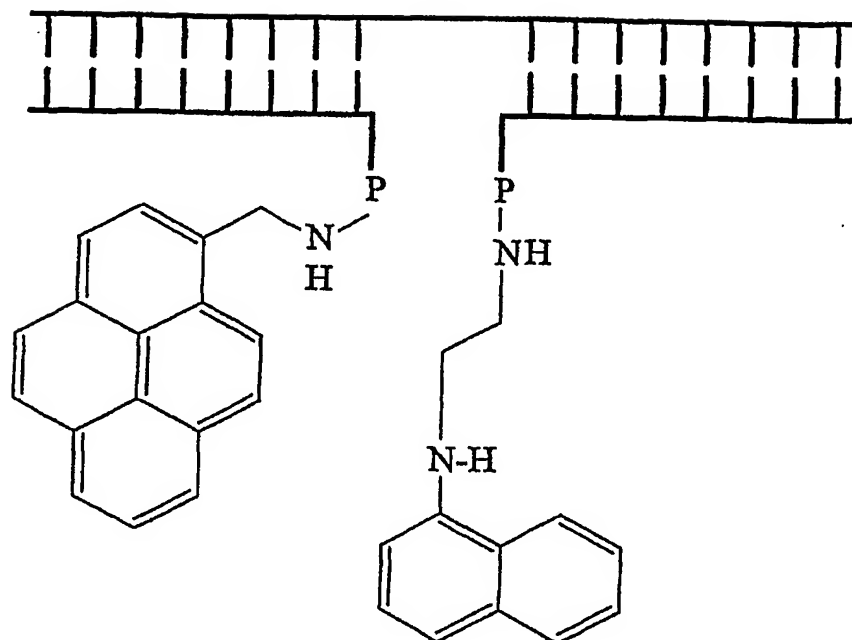
SP-19



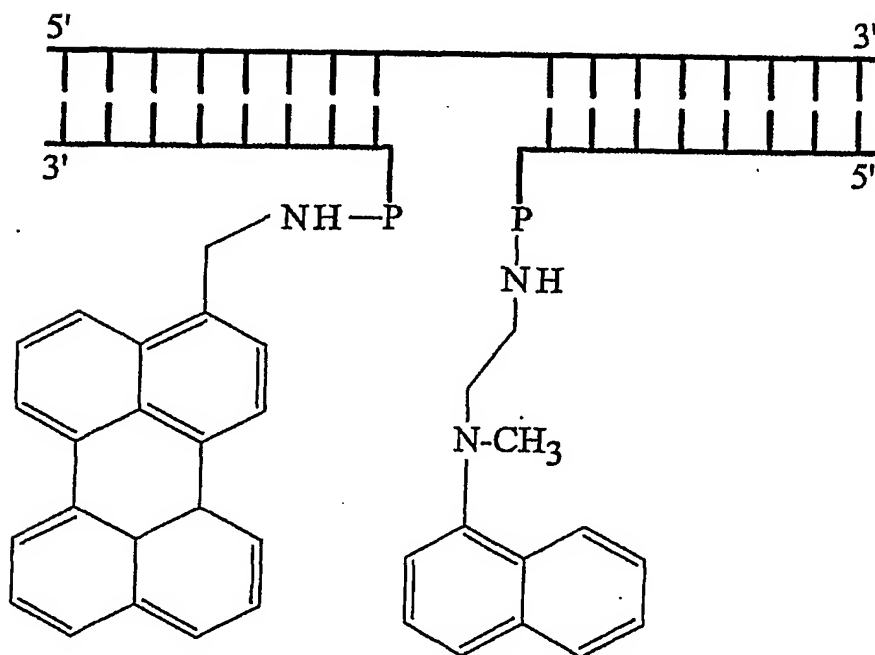
SP-20



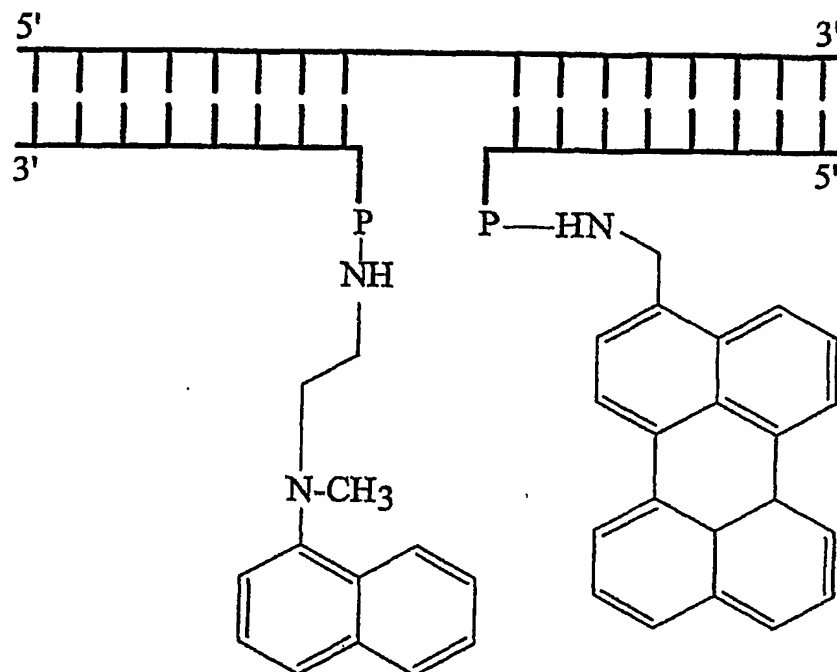
SP-21



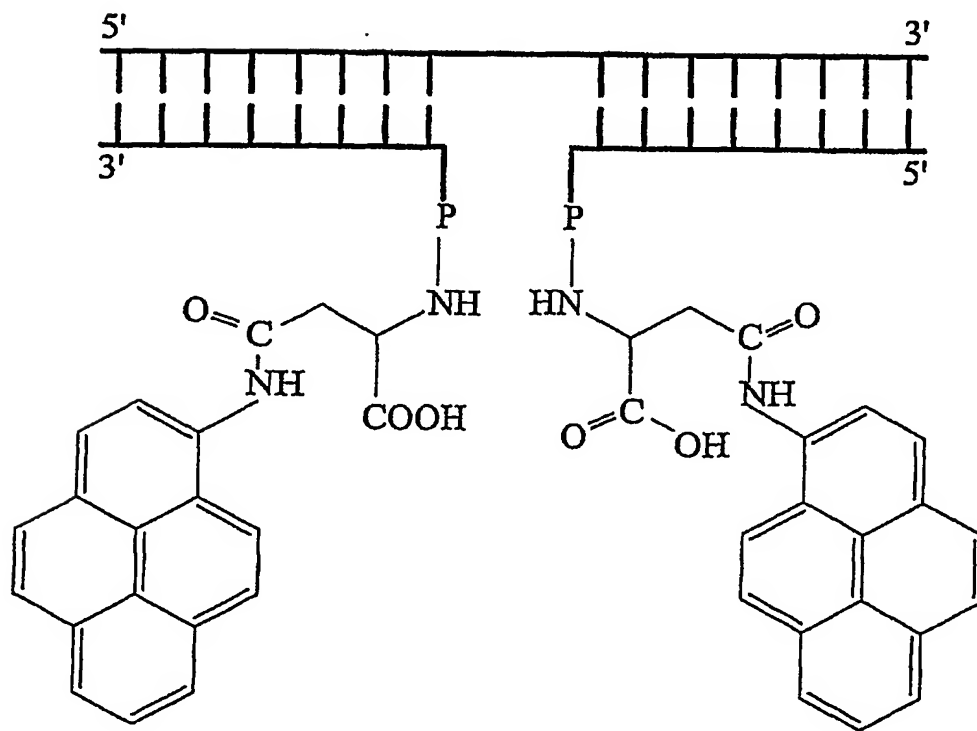
SP-23



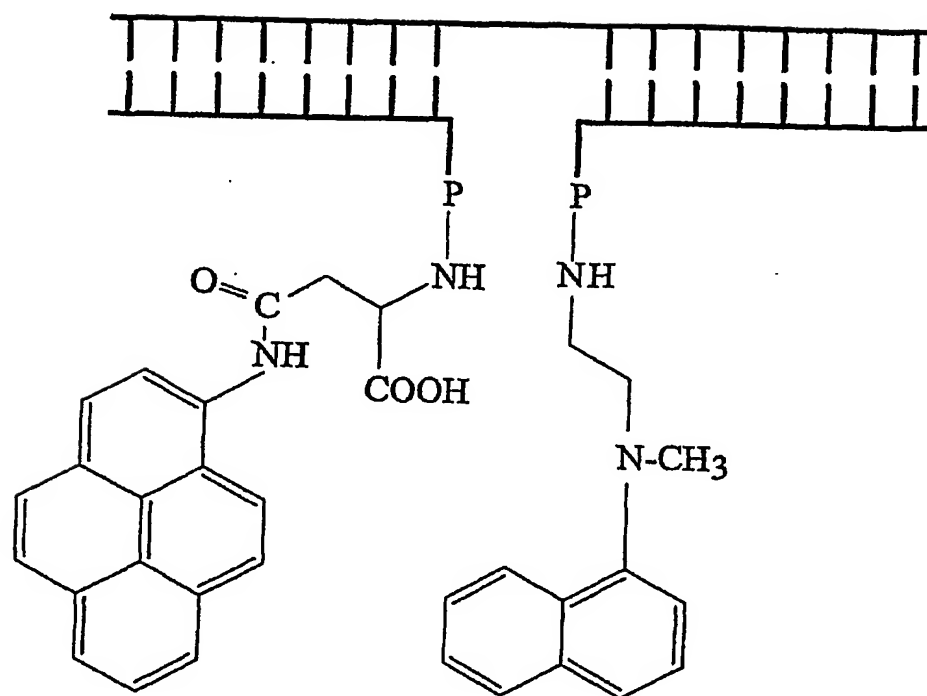
SP-24



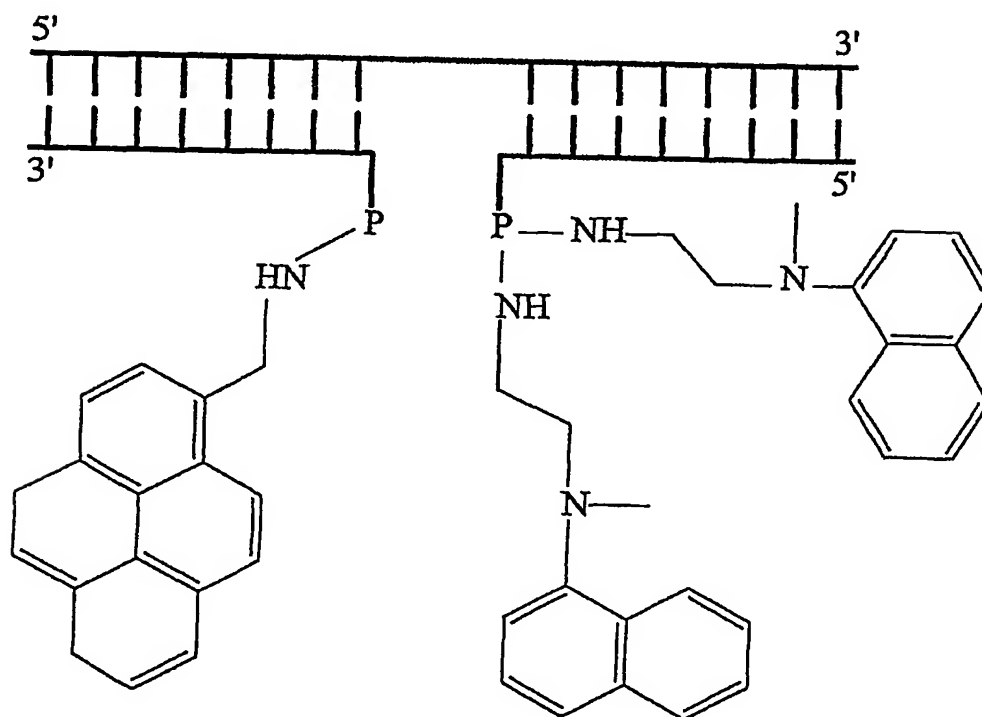
SP-25



SP-26



SP-34



SP-38

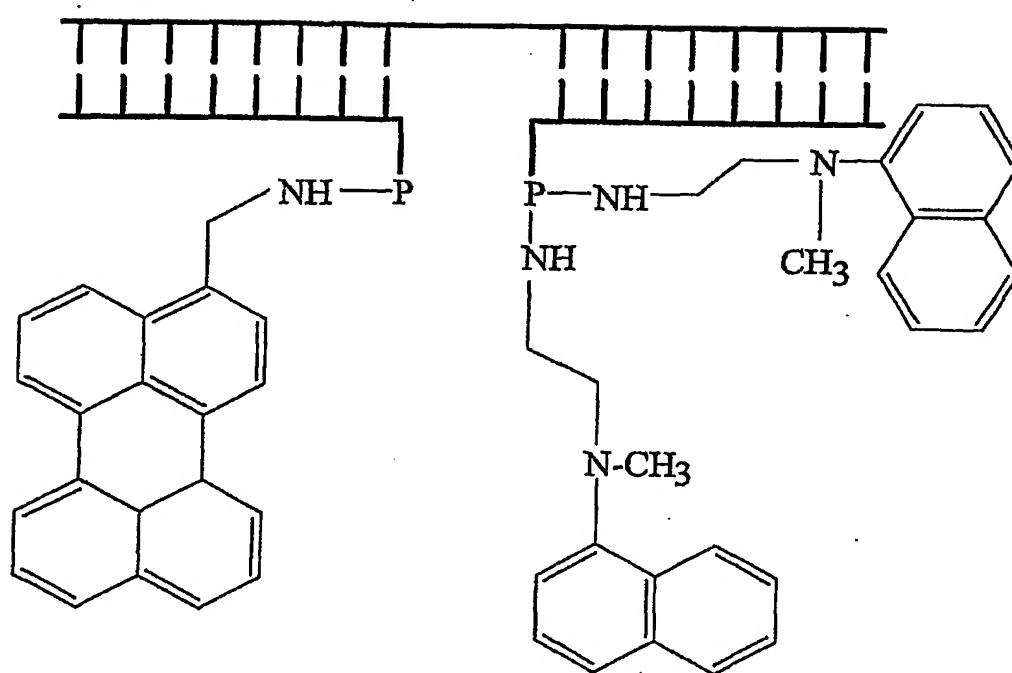
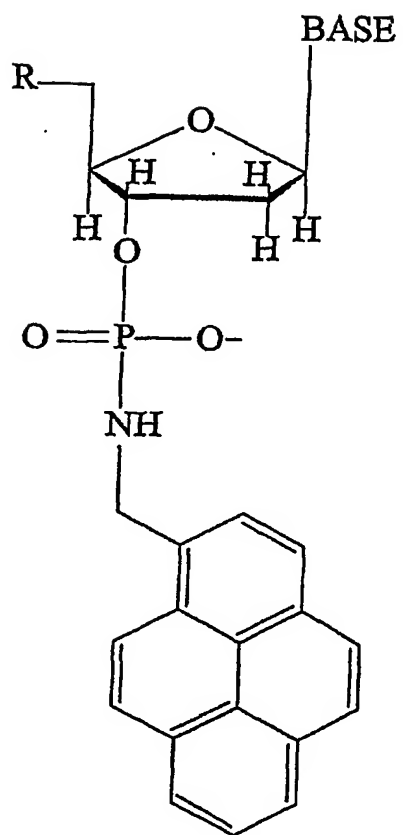




FIGURE 1a



3' Attachment of pyrene

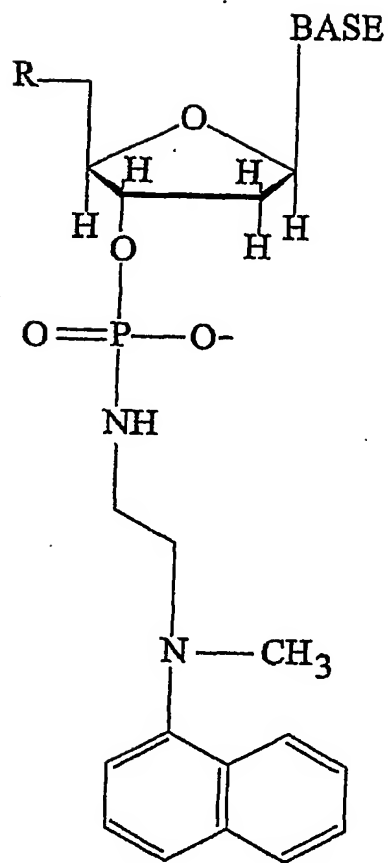
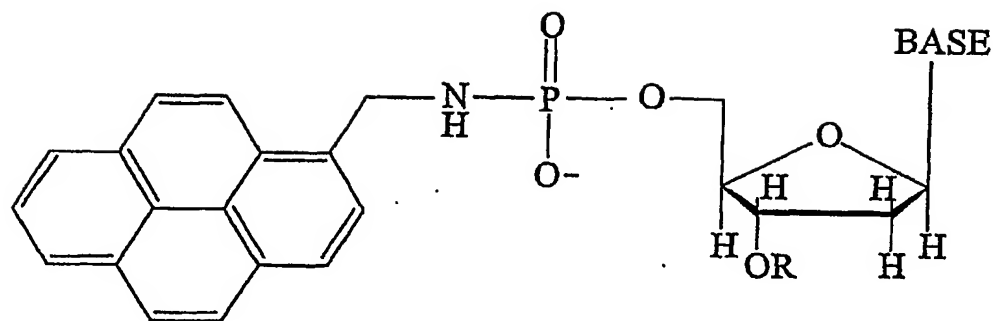
3' Attachment of  
naphthalene derivative

FIGURE 1a



5' Attachment of pyrene

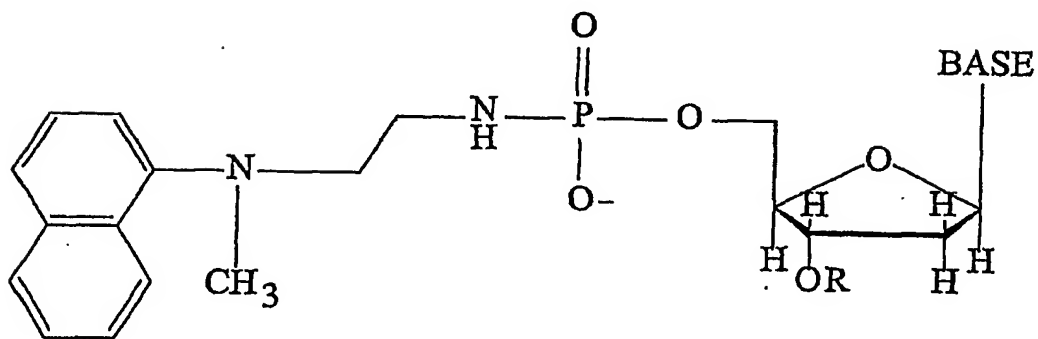
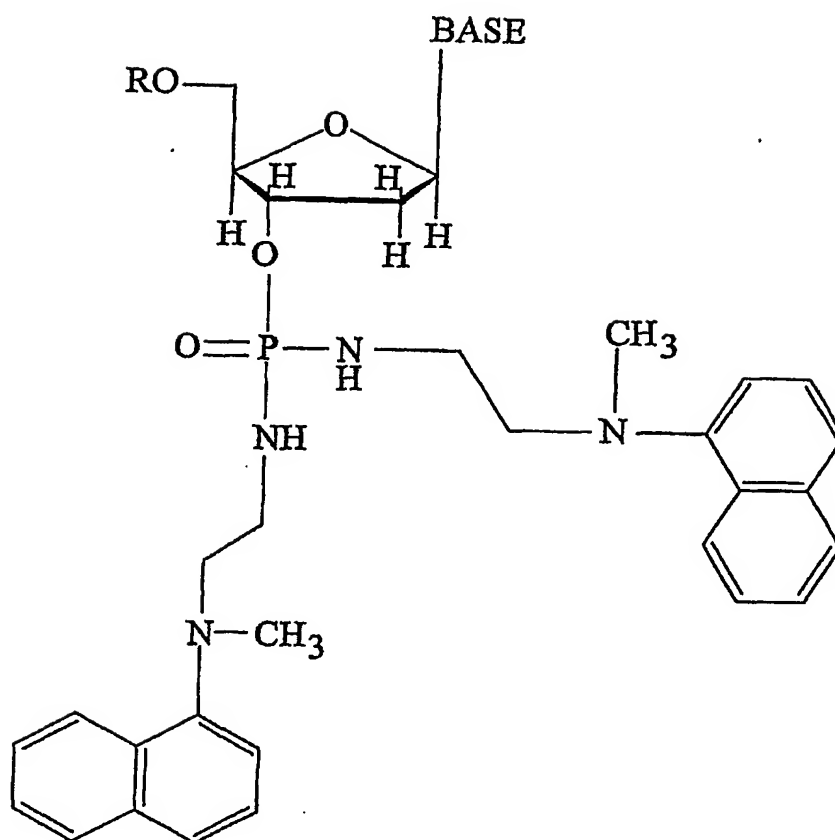
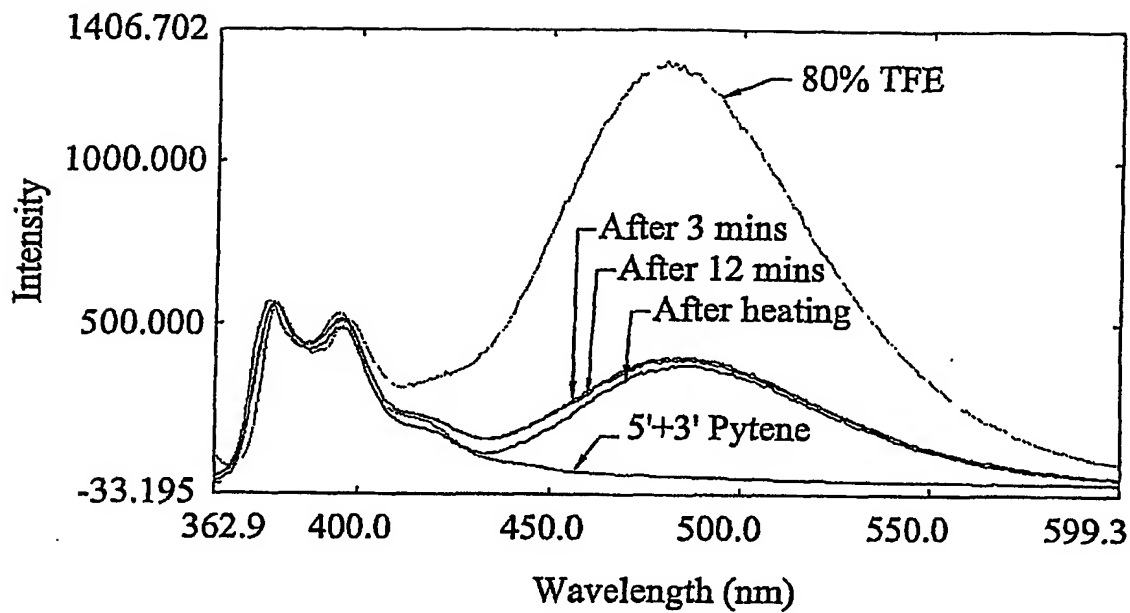
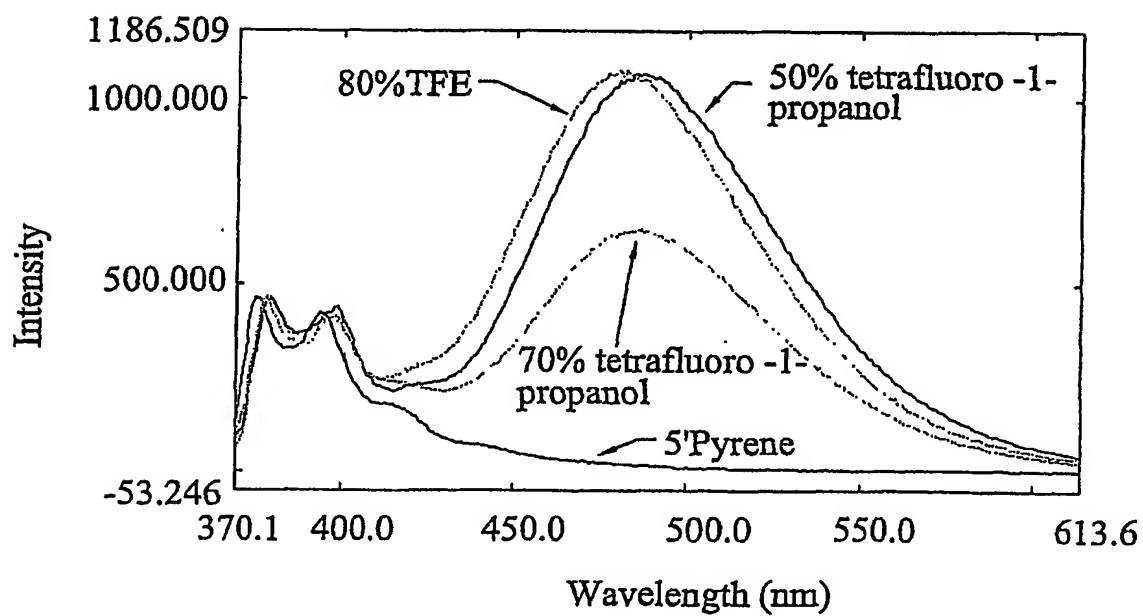
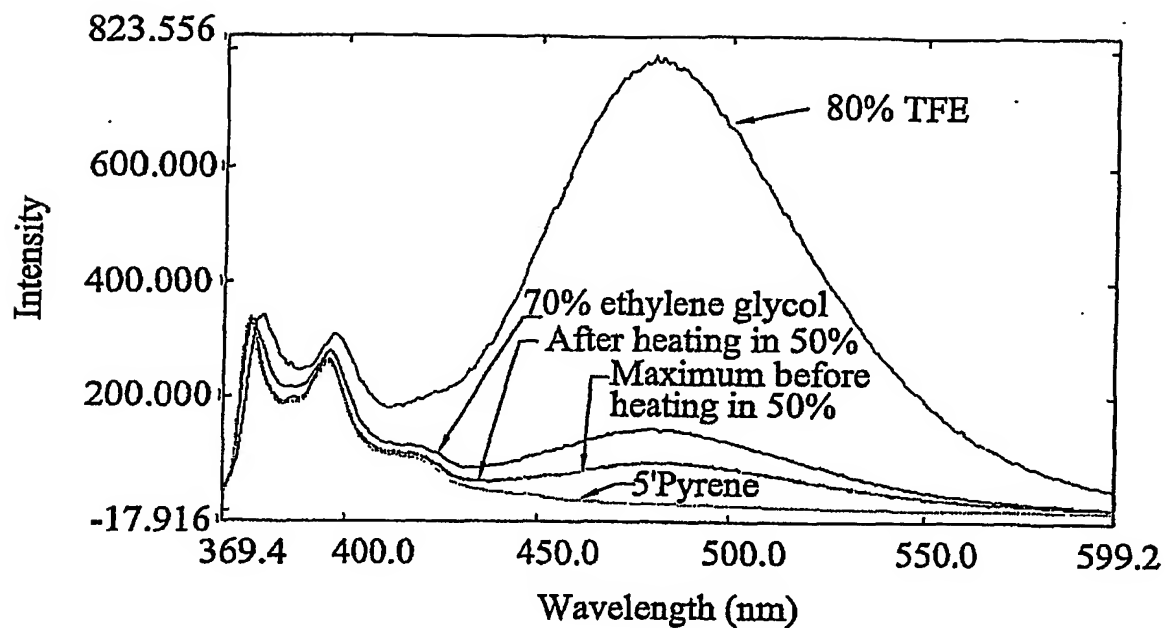
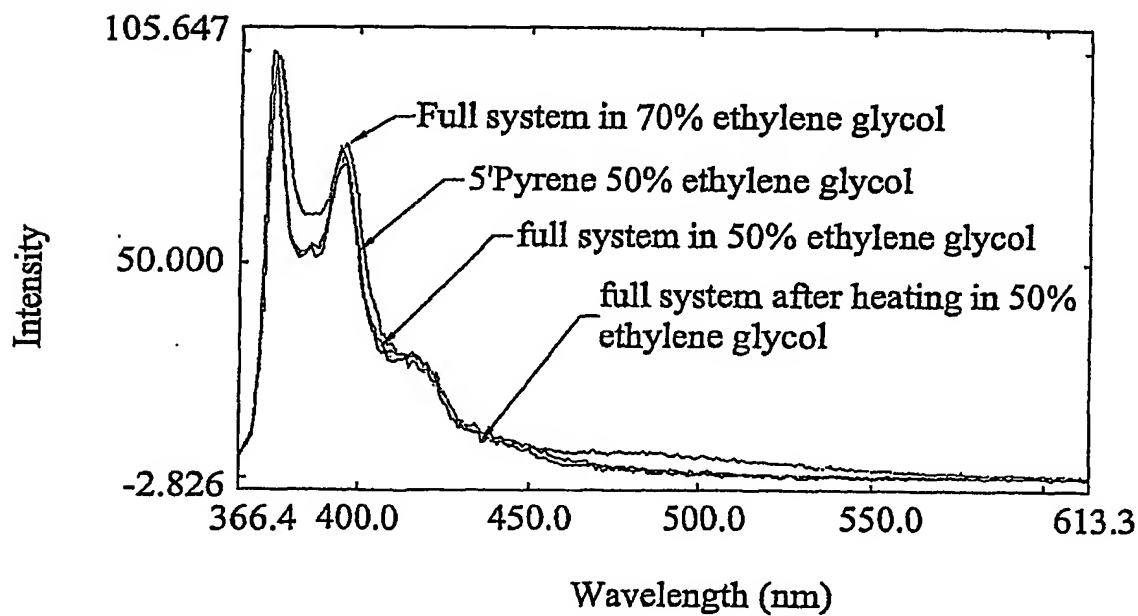
5' Attachment of naphthalene  
derivative

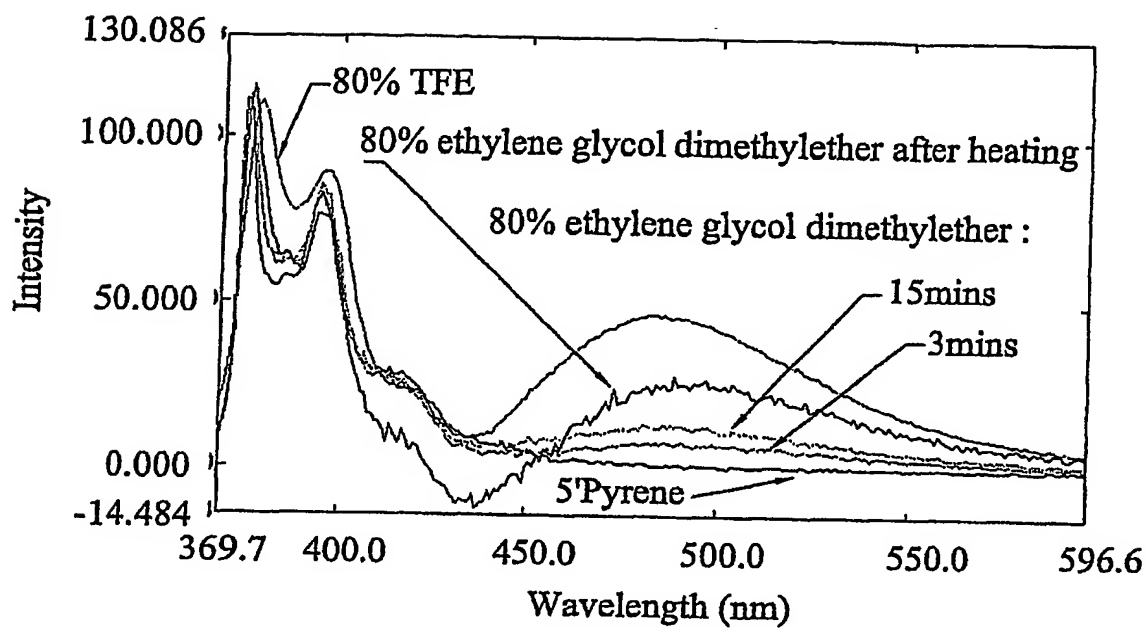
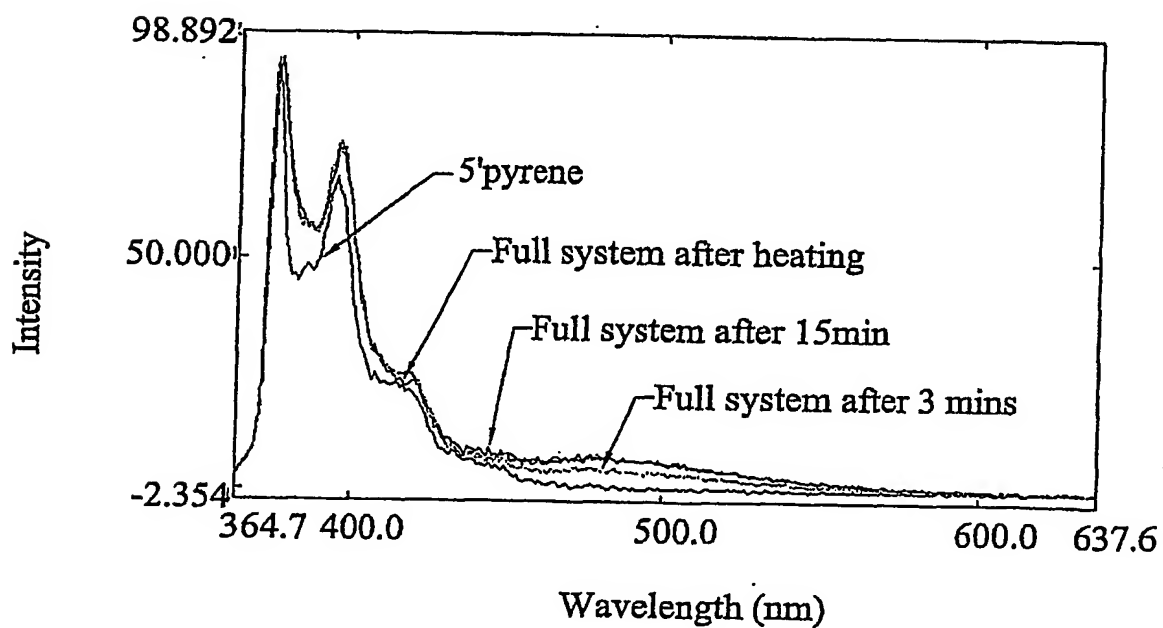
FIGURE 1a



3' Attachment of bio-naphthalene derivative.

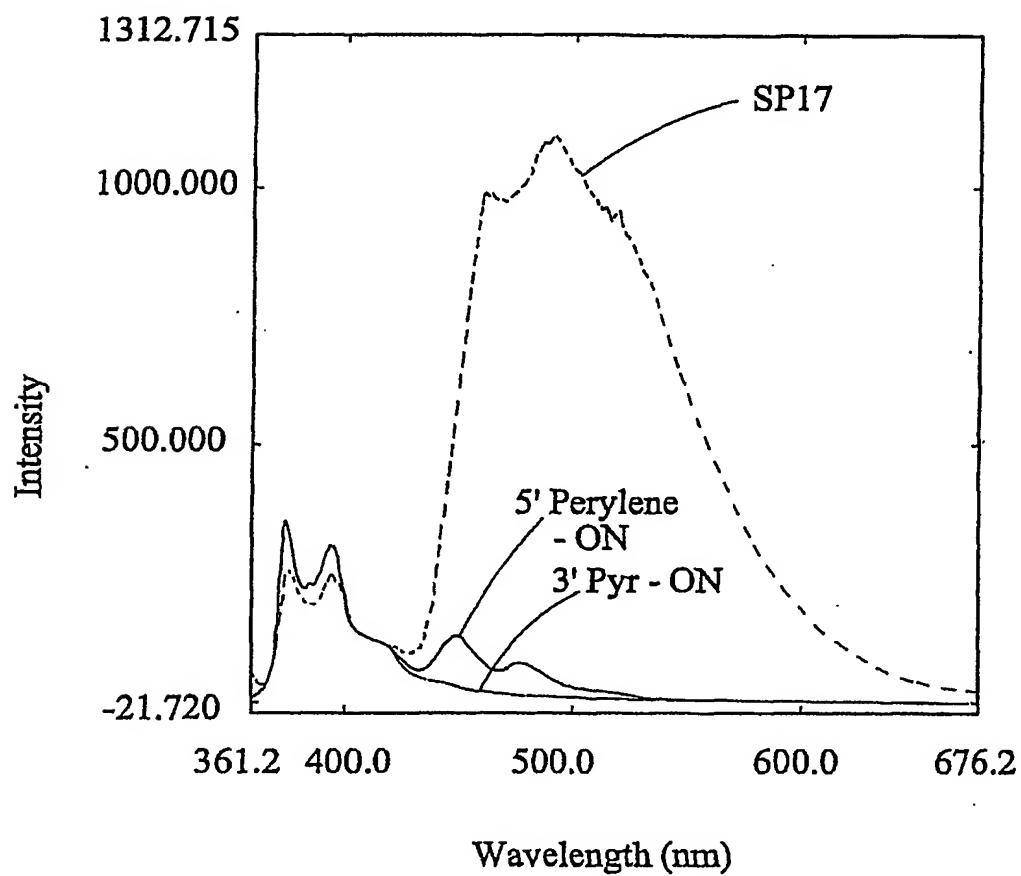
FIG 2FIG 3

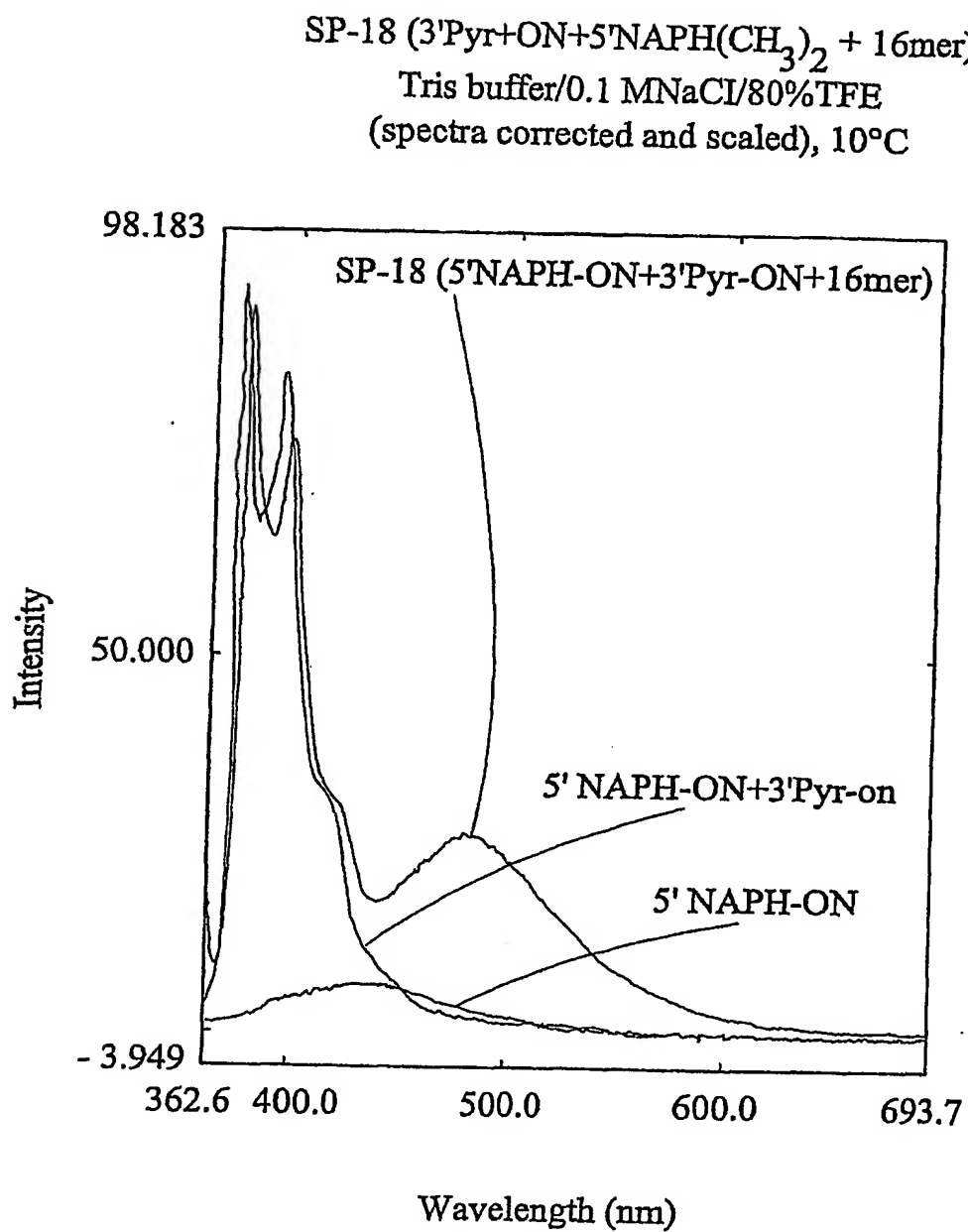
FIG 4FIG 5

FIG 6FIG 7

## Emmission spectra of SP-17

(EXT at 350nm)

80% TFE in Tris buffer, pH 8.5  
2.5  $\mu$ M duplex, spectra are scaledFIG 8

FIG 9



SP-19 (5'Pyr-ON+3'NAPH-ON+16mer)  
(in Tris buffer/0.1MNaCl/80%TFE  
(spectra corrected and scaled)

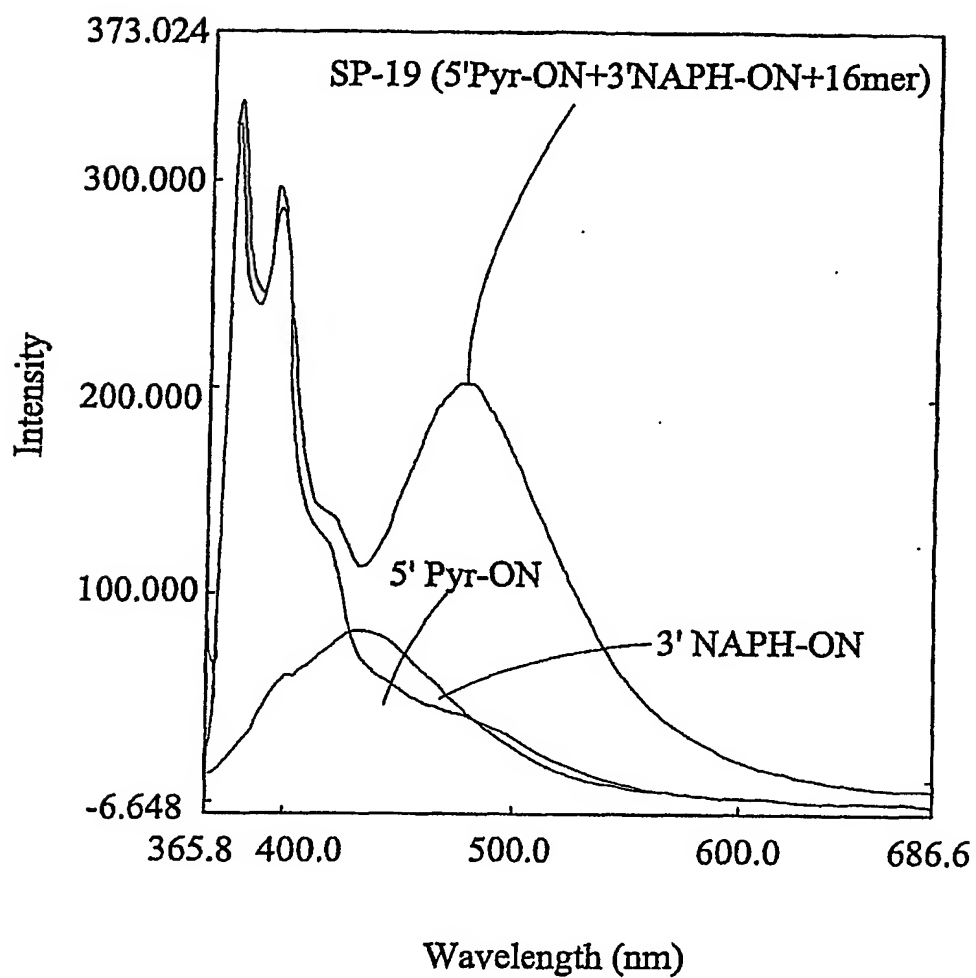


FIG 10

Melting temperature experiment for SP-19 in Tris buffer/THF system (10 mM Tris, pH 8.3, Na Cl based on 80% TFE/20% water solution).

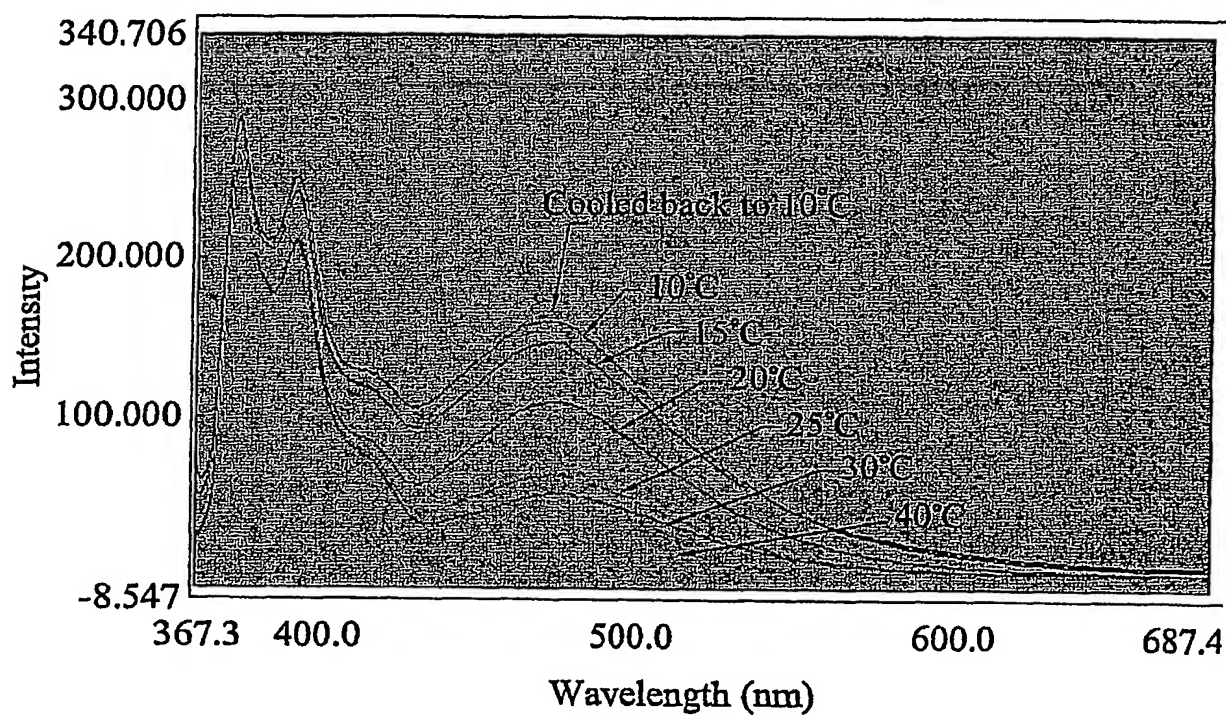


FIG 11

SP-19 systems and its components in Tris buffer/THF solution.  
(10 mM Tris, pH8.3, 0.1M NaCl based on  
80% TFE/20% water solution).

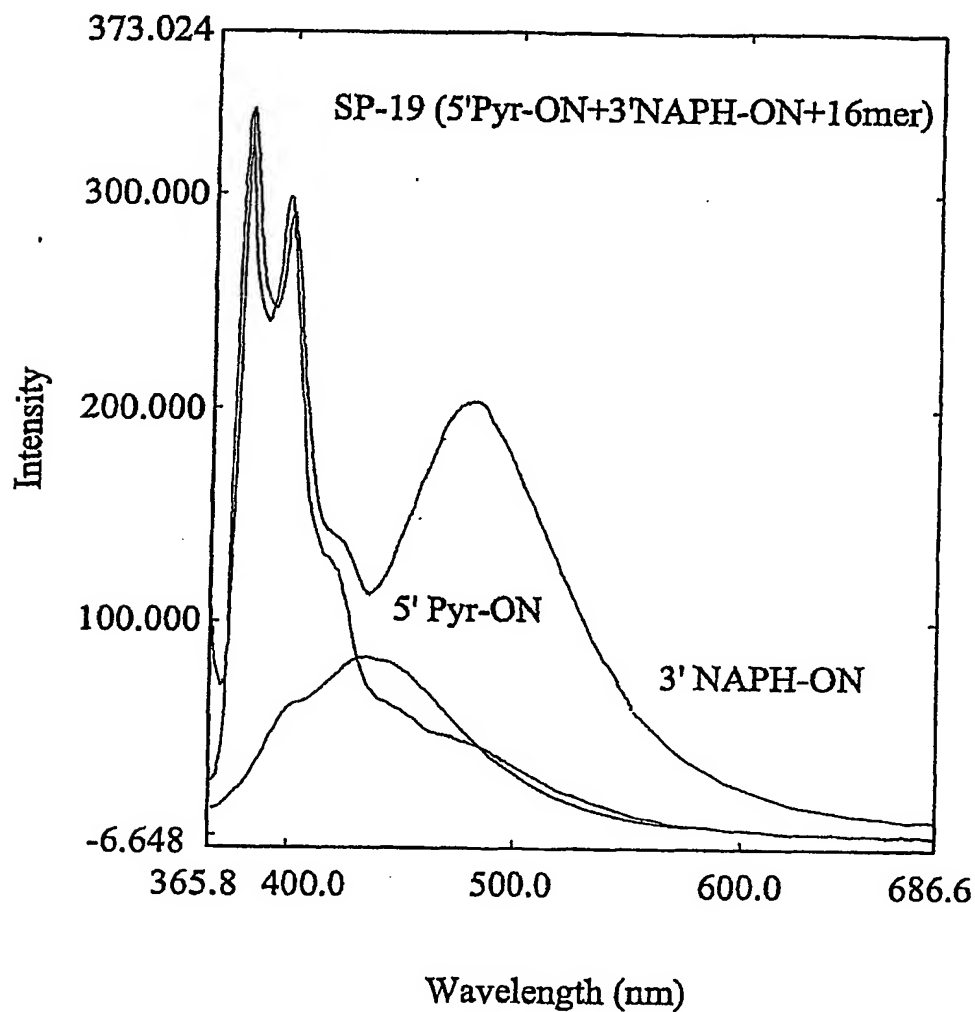
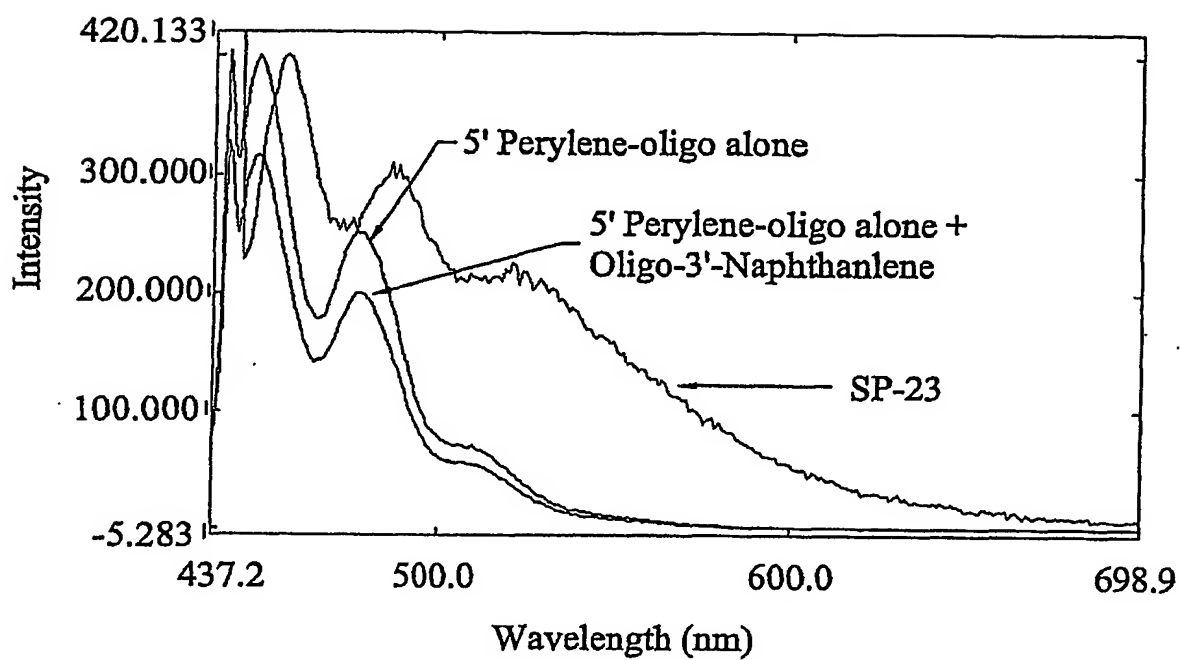


FIG 12 (A)

FIG 12B

Comparison of excited-state complex emission within  
DNA split-probes possessing different donor partner

10 C, 10mM Tris,pH 8.3,0.1MNaCl/80% TFE.

Spectra are scaled using monomer band at  
380nm as a reference

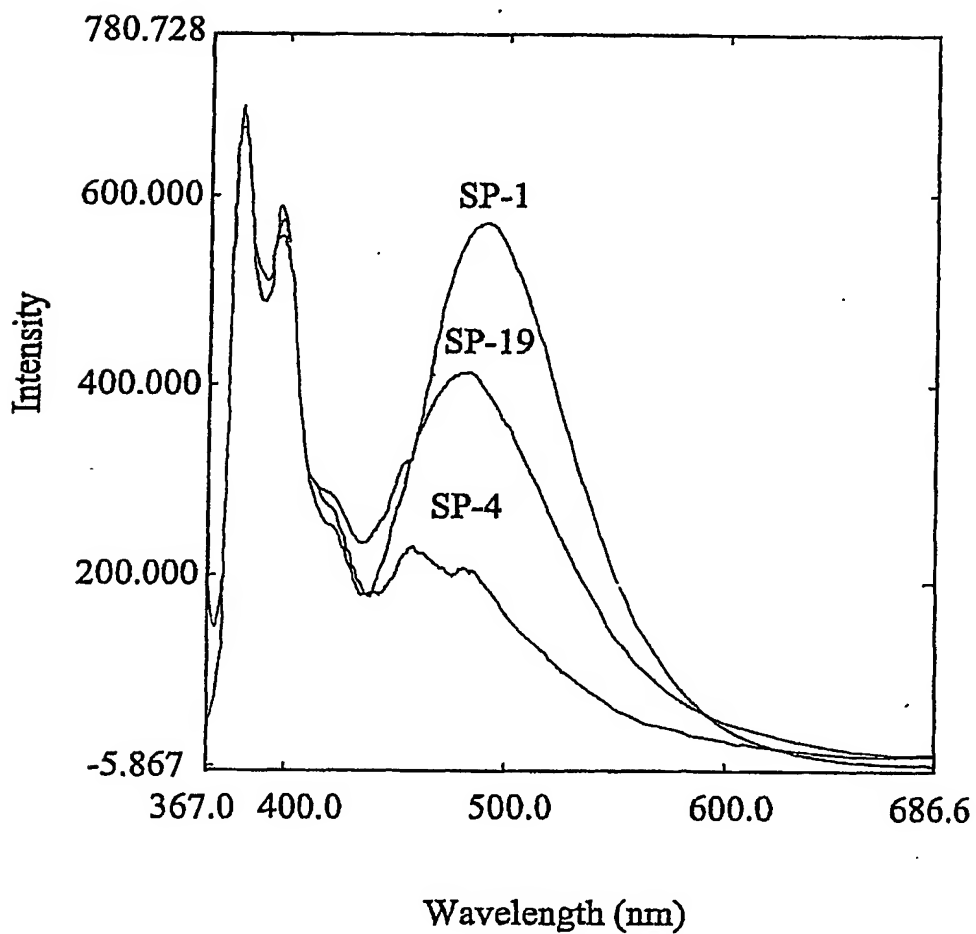


FIG 13

### Emission spectra of SP-18 and SP-20

SP-18 possesses N-methylaminonaphthalene,  
SP-20 possesses N,N-dimethylaminonaphthalene  
(10mM Tris, pH 8.3, 0.1M NaCl/80%TFE)

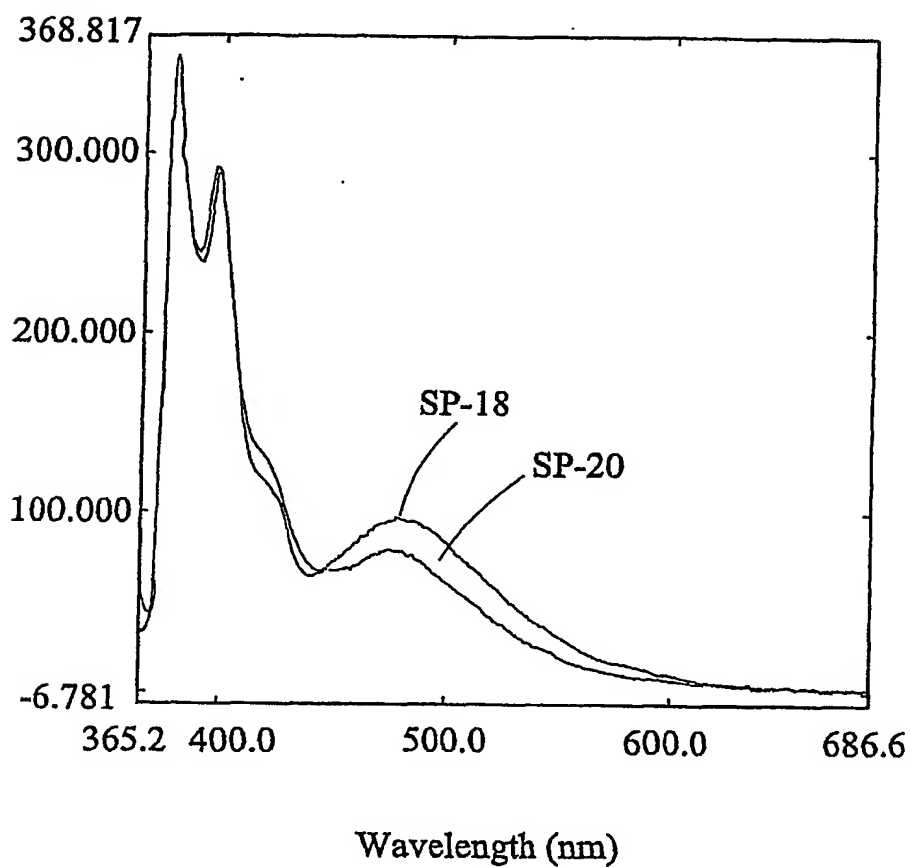


FIG 14

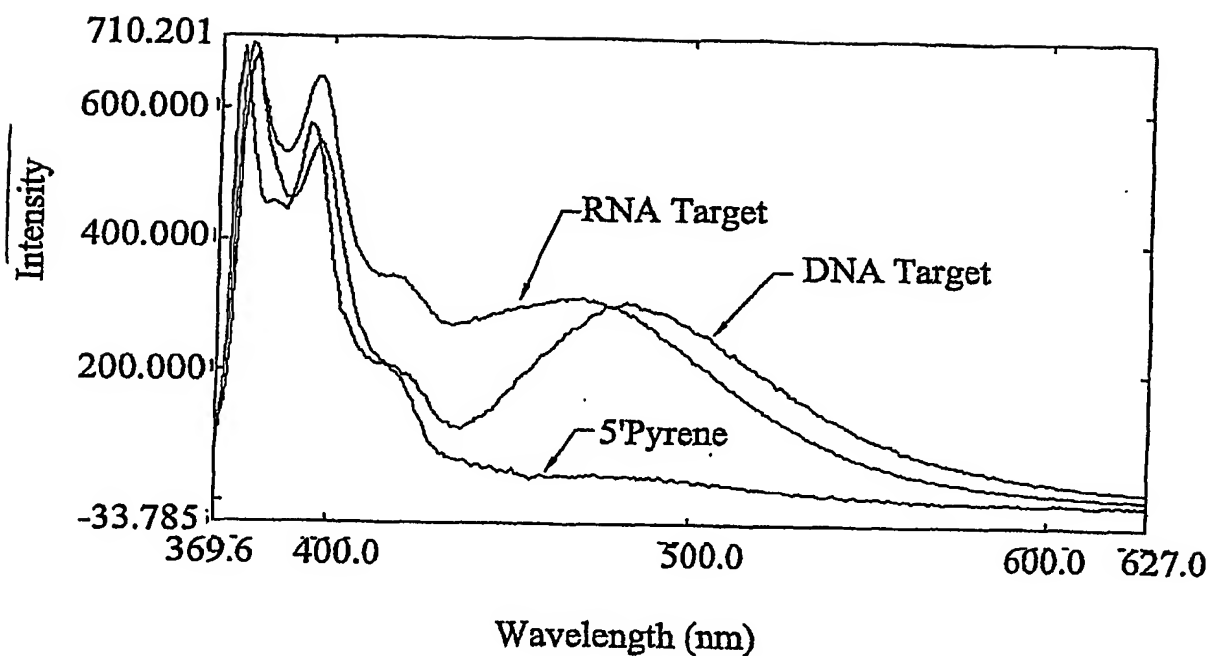


FIG 15A

Comparison of emission spectra of the RNA-BASED SP-19 system with the DNA-Based SP-19 system in 80% TFE? Tris (pH 8.5) at 10°C. Excitation wavelength 350 nm; slitwidth 5 nm; spectra are scaled to monomer emissions.

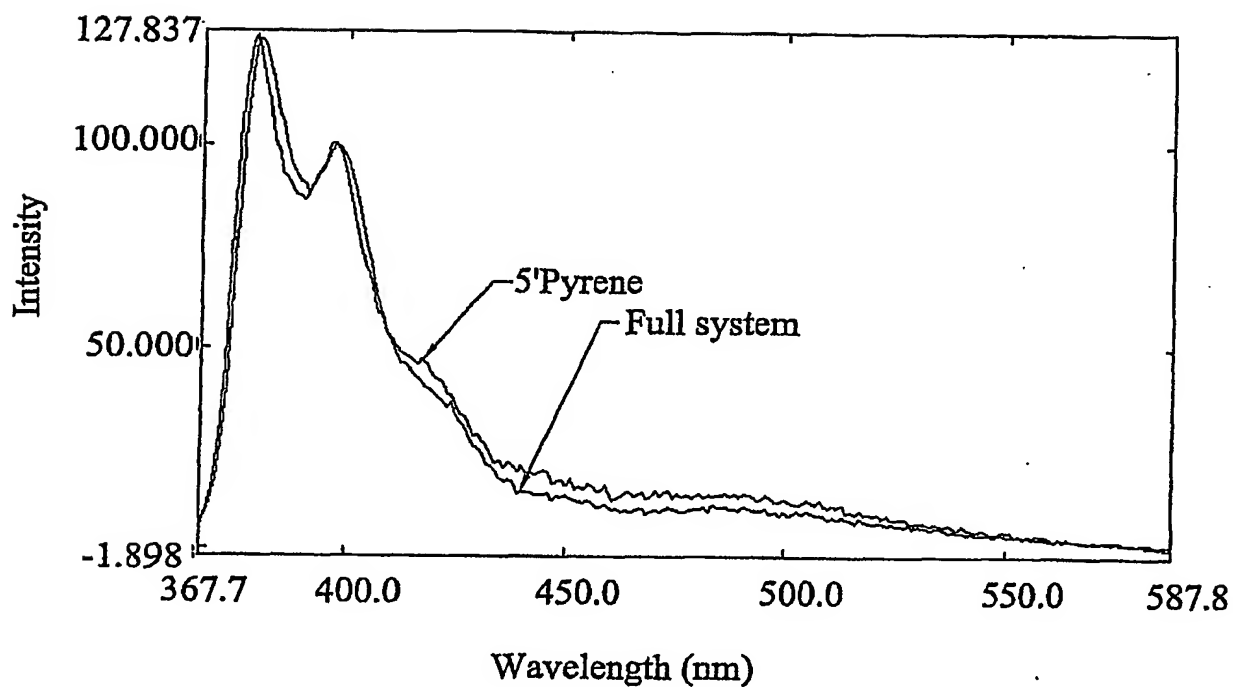


FIG 15B

Emissions spectra of 5-pyrene-bearing oligo (ON1-5'pyrene) and the full RNA-BASED SP-19 system in Tris buffer at 10°C showing the small background exciplex fluorescence. Excitation wavelength 350 nm; slid with 5 nm; spectra are scaled to monomer emission.



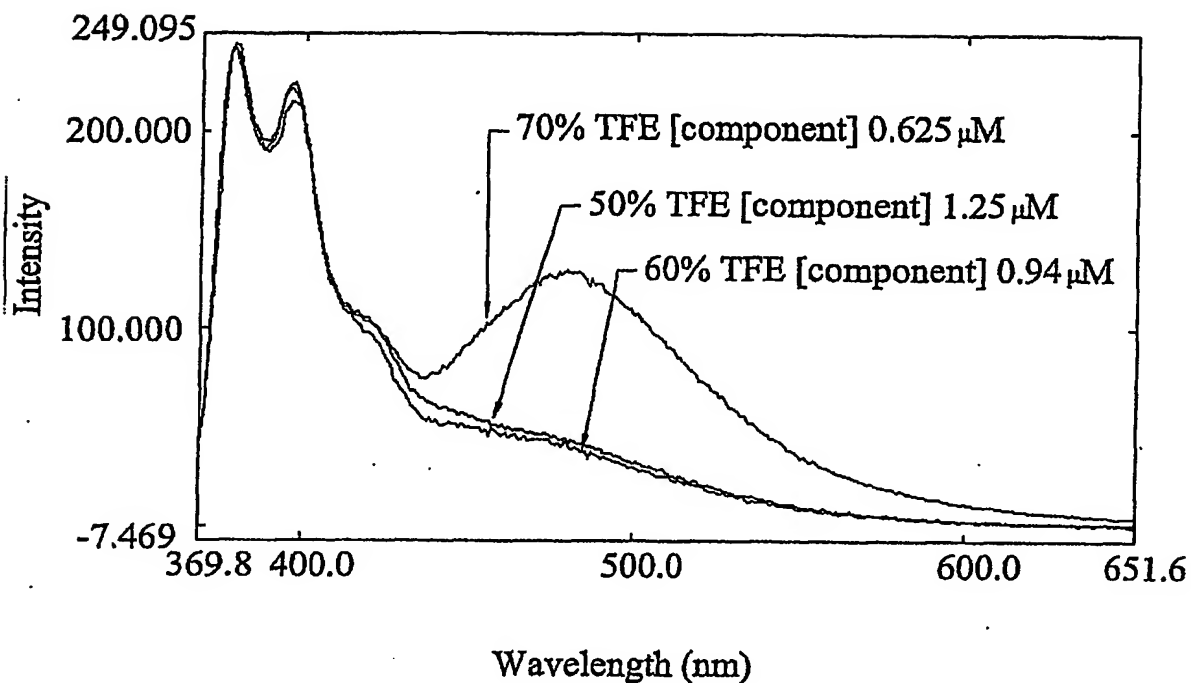


FIG 15C

Emission spectra of RNA-BASED SP-19 in Tris buffer at various TFE concentrations. All spectra were recorded at 10°C using an excitation wavelength of 350 nm; slidwidth 5 nm; spectra are scaled to monomer emission.

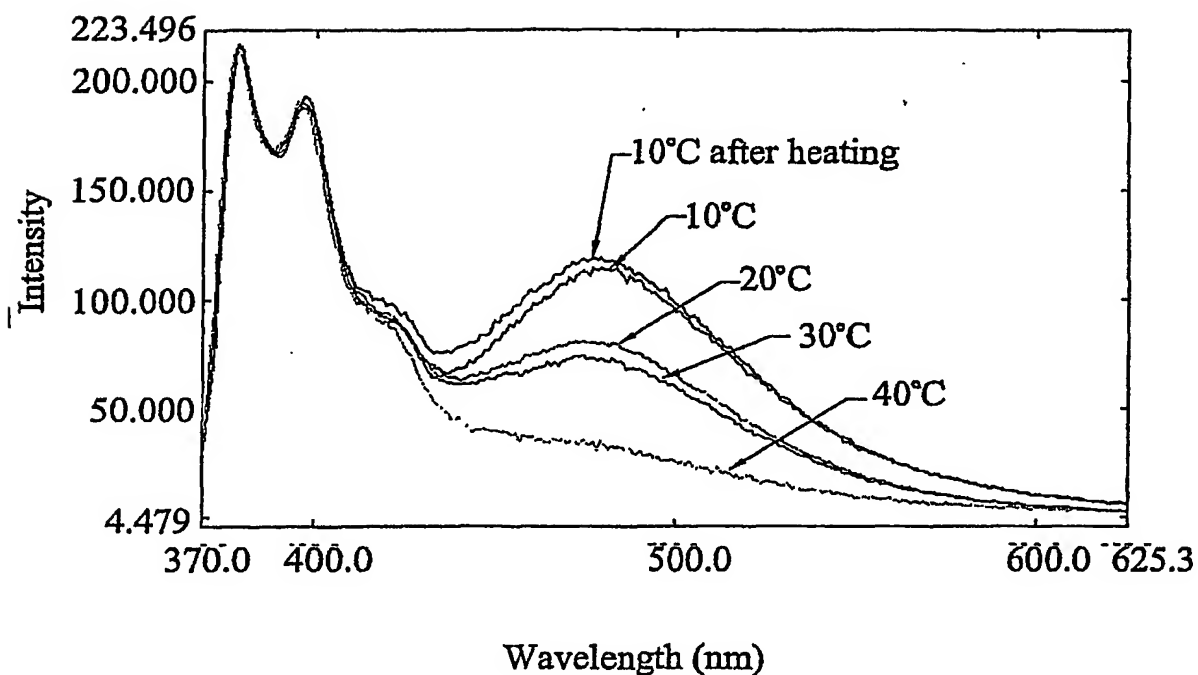


FIG 15D

Emission spectra of the RNA-BASED SP-19 system in 70% TFE/ Tris buffer (component concentration 0.625  $\mu$ M) showing how exciplex decreases on heating to 40°C and reappears after cooling back to 10°C. Excitation wavelength 350 nm; slidwith 5nm; spectra are scaled to monomer emission.

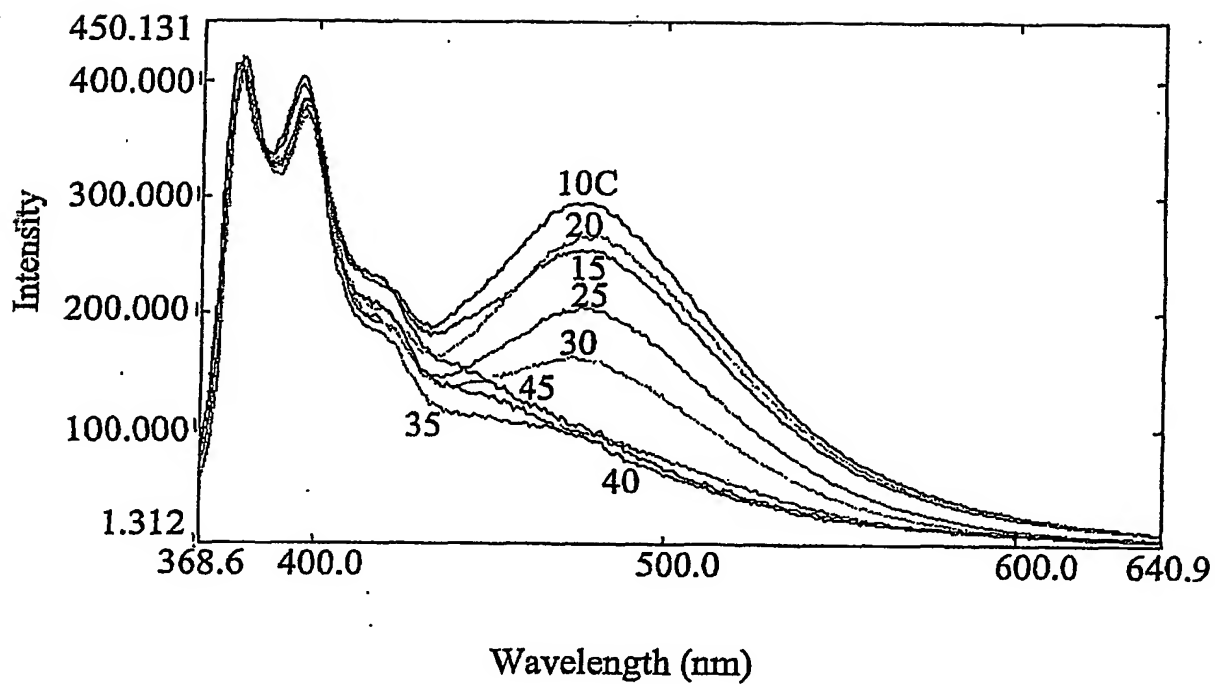


FIG 16

melting curve for RNA\_SP19. Spectra are recorded in Tris buffer with 72% TFE and scaled to monomer emissions

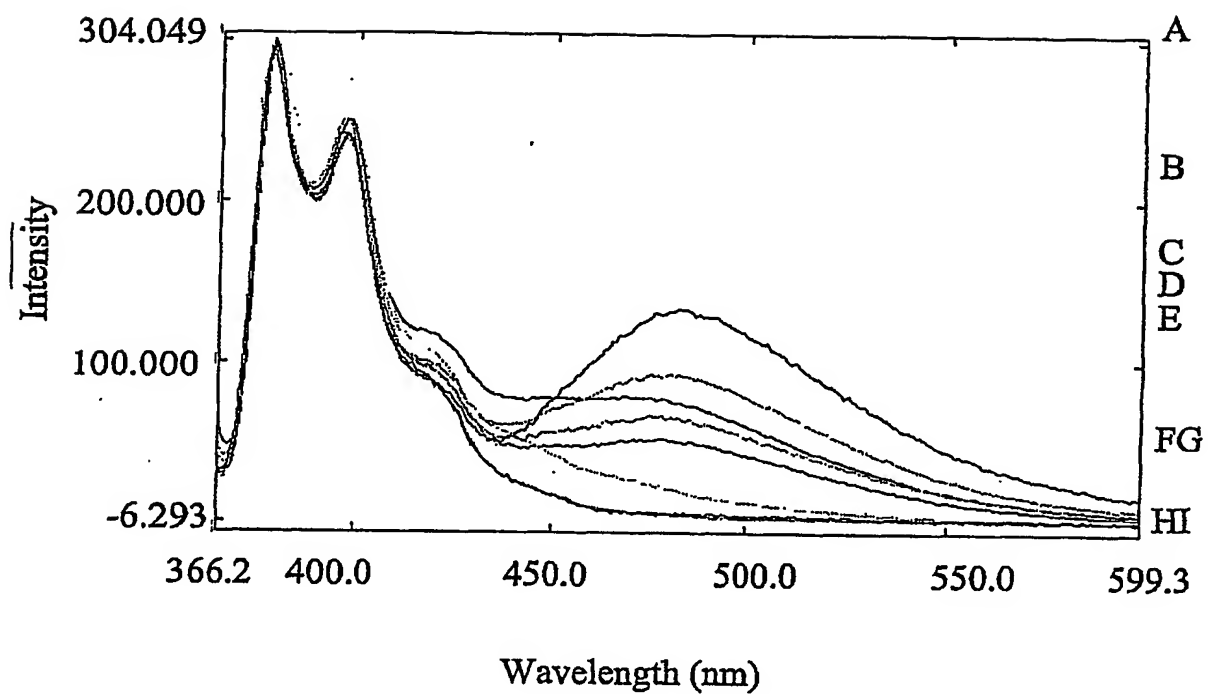


FIG 17

Comparison of Mismatch systems for SP19 exciplex system I before heating.  
A=Parent, B=3'mismatch 3, C=3'mismatch 1, D=5'mismatch 3,  
E=3'mismatch 2, F=5'mismatch 1, g=5'mismatch 2, H=3'double mismatch,  
I=5'double mismatch

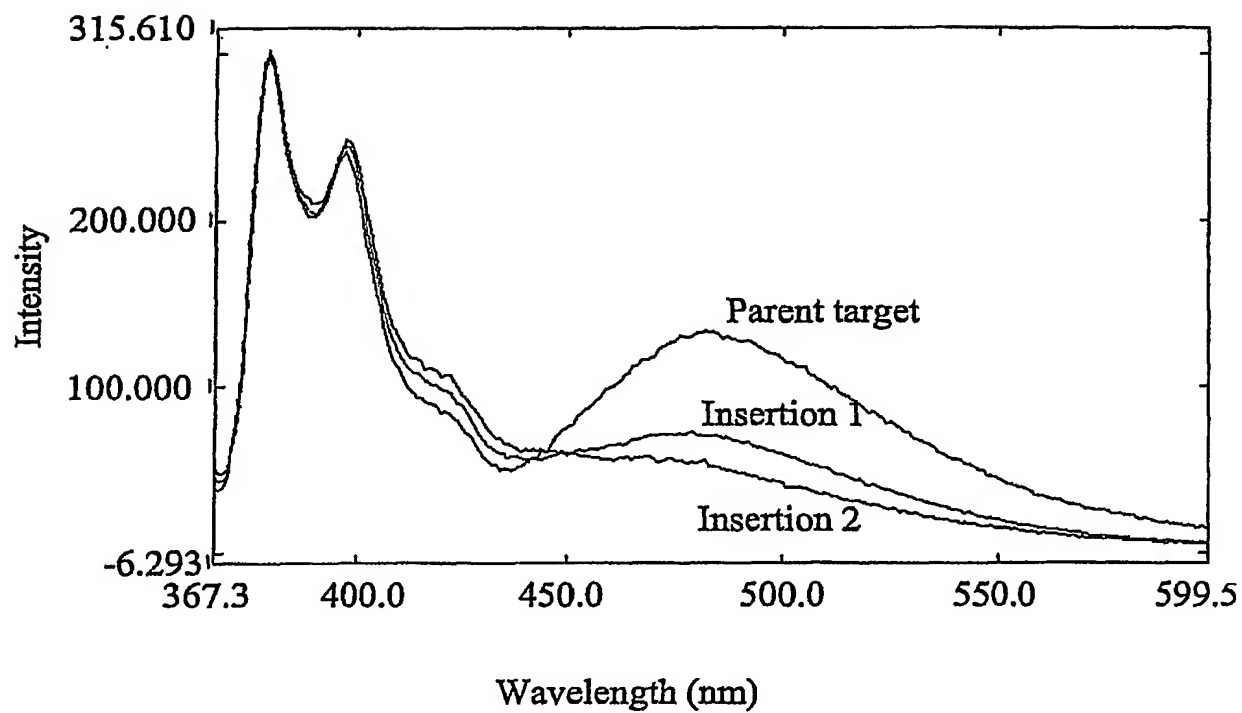
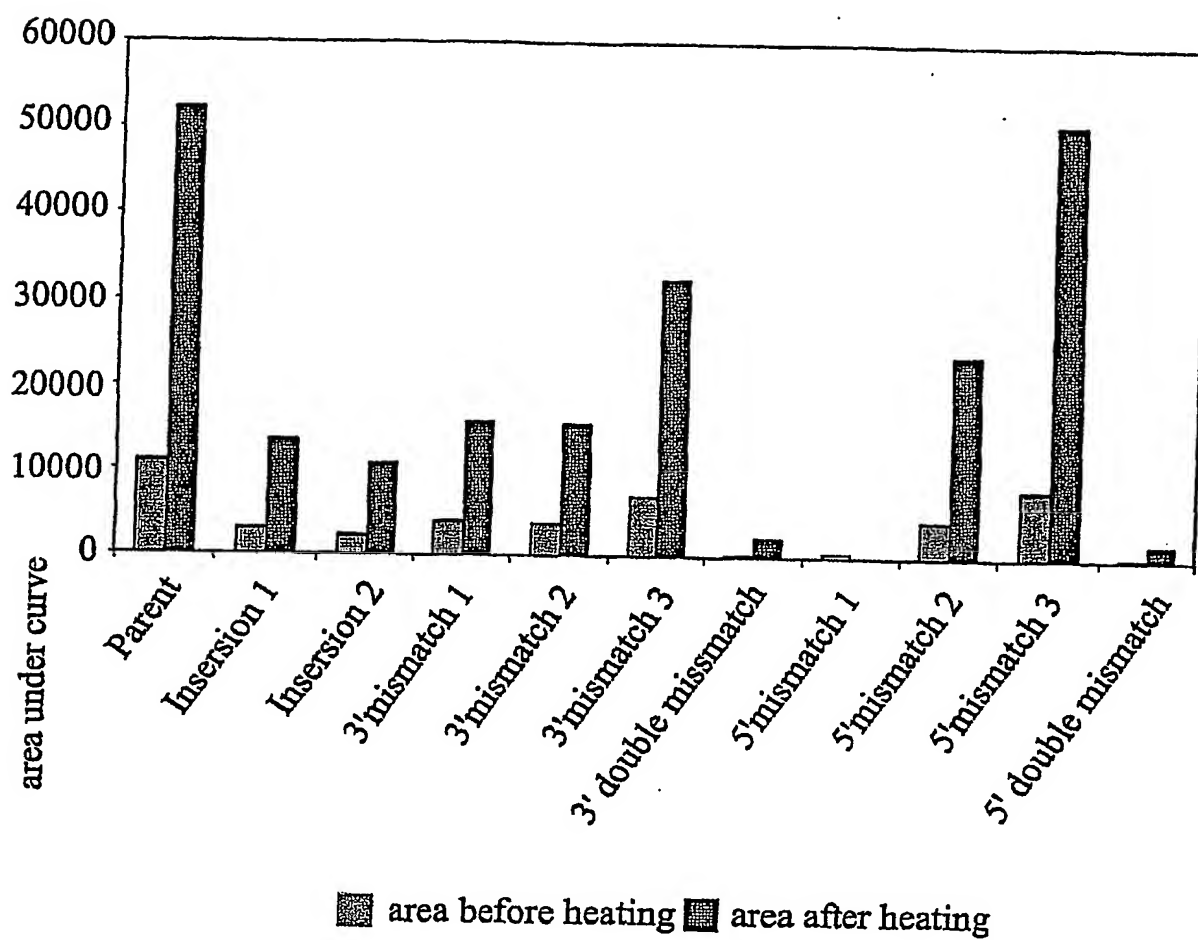


FIG 18

Comparison of Insertion for SP19 exciplex system I before heating.

FIG 19A

Area under the curve for the SP-19 system from 480-600 nm before and after heating to 40 C. Spectra were recorded in 80% TFE/Tris buffer (10mM Tris, 0.1 M NaCl, pH 8.5) at 10 C. Excitation wavelength 350nm; slidwith 3nm. Spectra are buffer corrected.

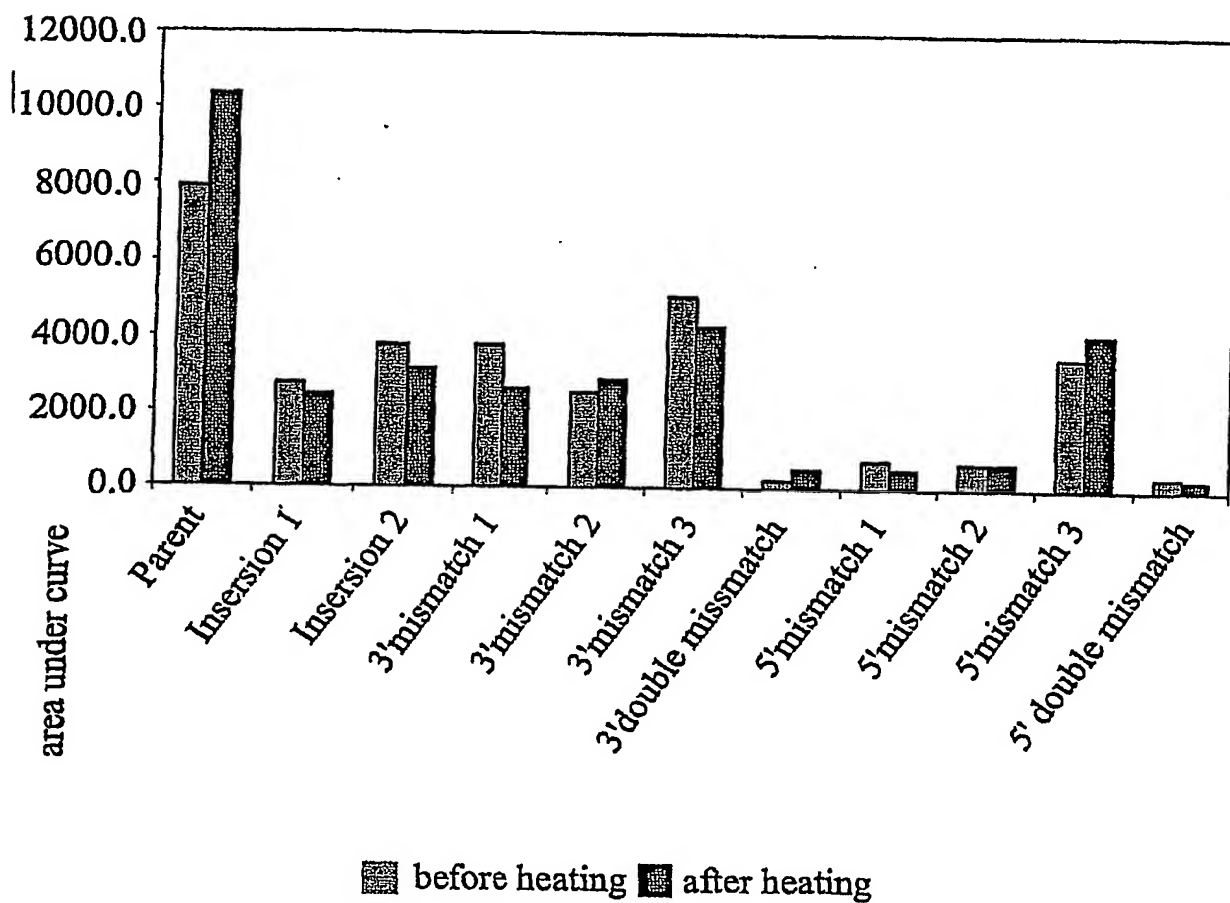


FIG 19B

SP-25 in Tris buffer (10 mM Tris, pH 8.34  
0.1 M NaCl) in presence and absence of TFE  
(Ext at 347nm; all spectra are scaled except 5'Pyr)

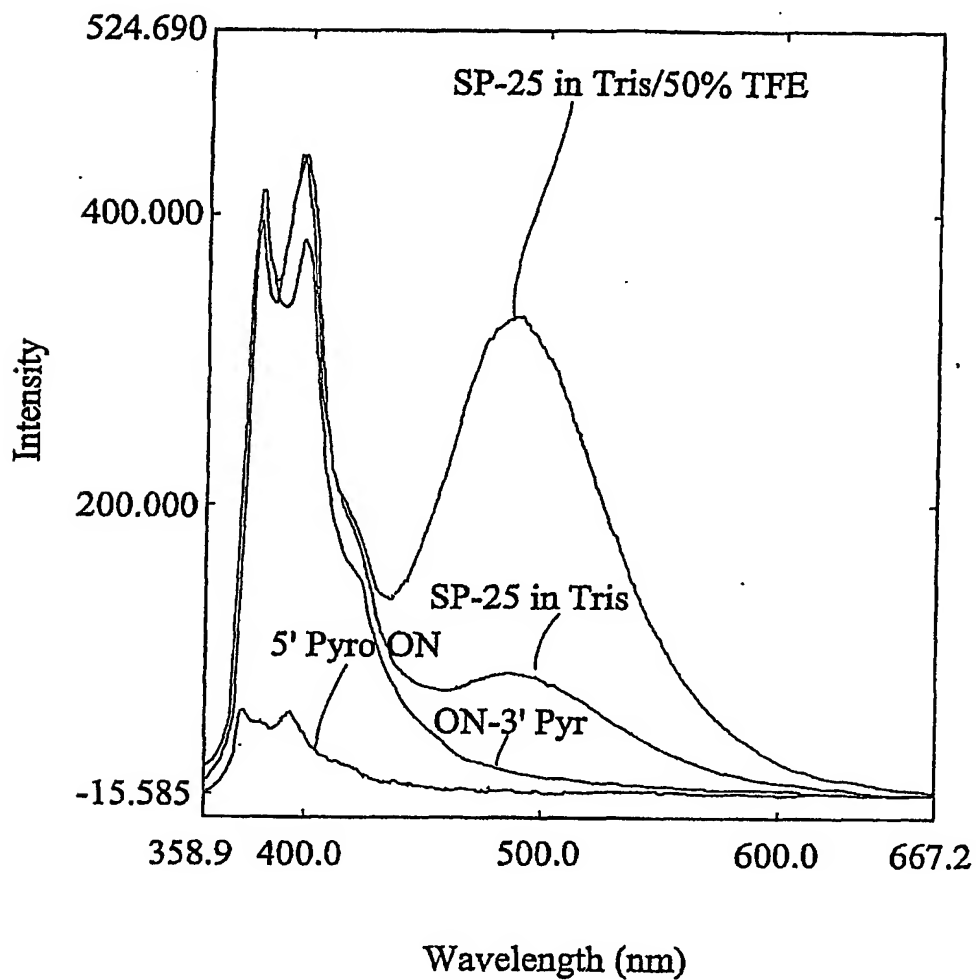
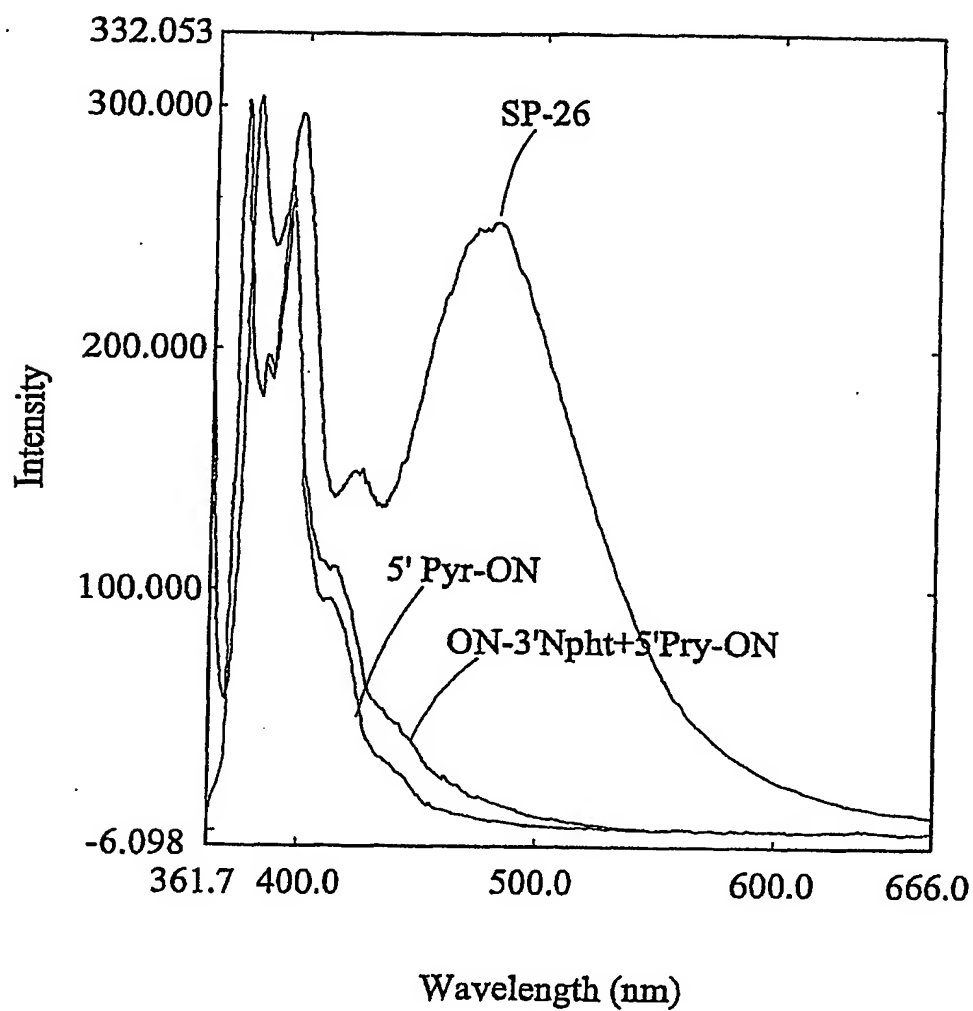


FIG 20.



SP-26 in Tris buffer/80% TFE

FIG 21

Emission spectra of ONI-5'Pyrene and ON2-3'Naphthalene in the presence of the target strand in Tris buffer at 10°C both in the presence of 0.15 M sulfolane, showing the shift in  $\lambda_{\text{max}}$  and decrease in intensity on addition of target. Excitation 350nm, slitwidth 5nm

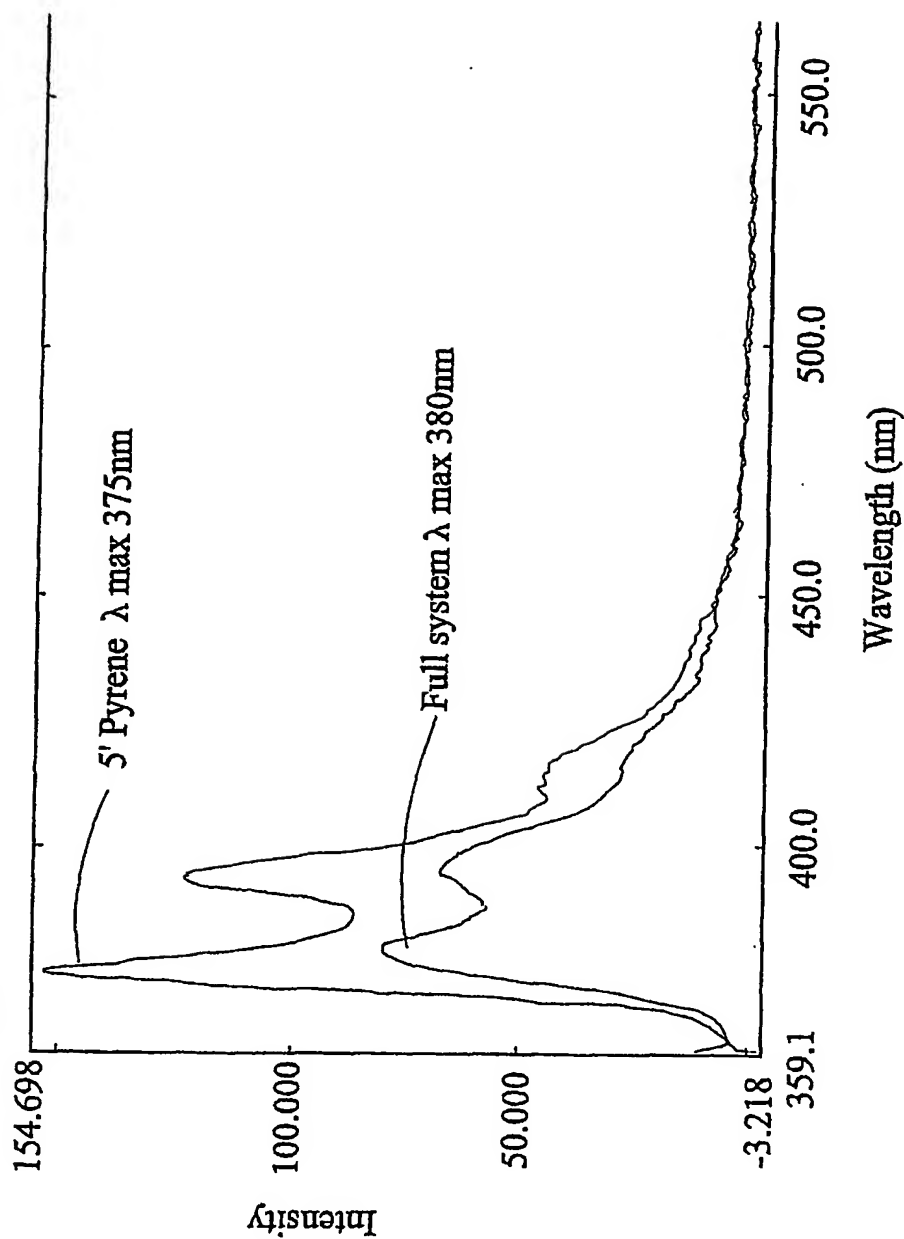


FIG 22

Emission Spectra of SP-19 in 80% TFE/ Tris buffer (10 mM Tris, 0.1 M NaCl, pH 8.5) at 10 C in the presence of 1 and 1.5 M betaine. Excitation wavelength 350nm, slidwith 5nm. Spectra are scaled to monomer emission at 378nm to correct for dilution effects.

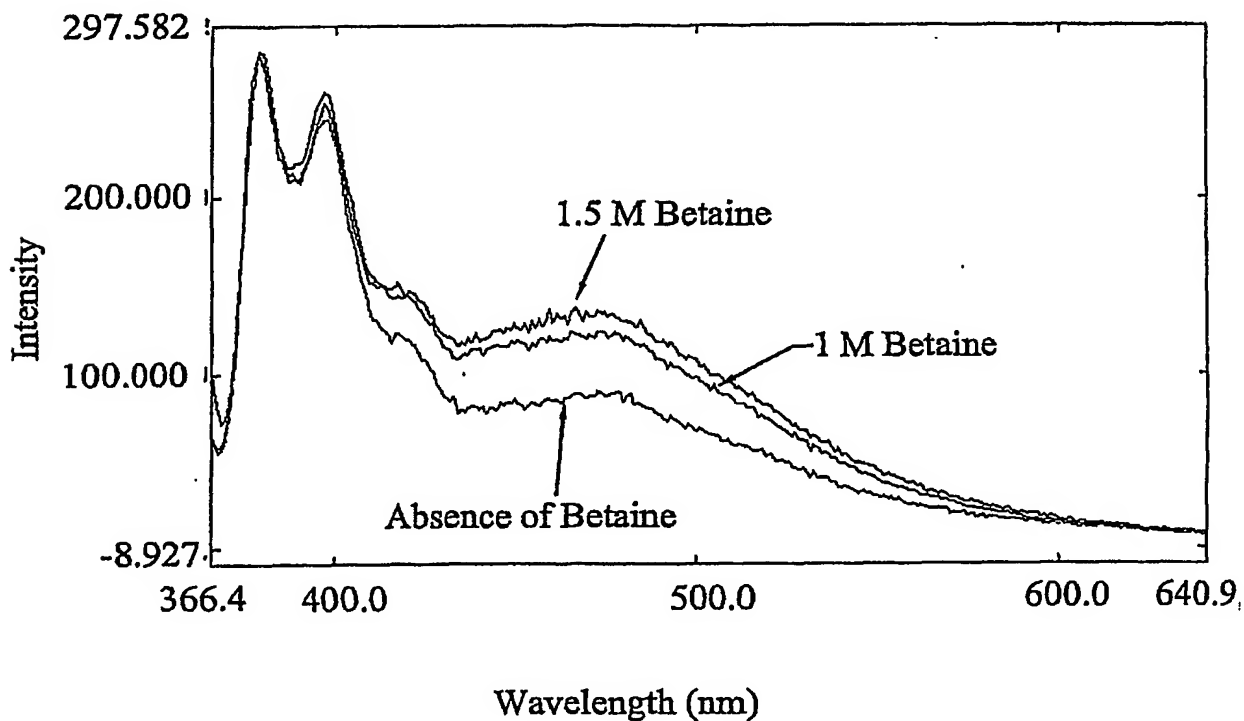


FIG 23

Emission spectra showing the effect of 0.15 M and 0.5 M sulfolane on the emission spectra of SP-19 in 80% TFE/ Tris buffer (10 mM Tris, 0.1 M NaCl, pH 8.5) at 10 C. Excitation wavelength 350nm; slidwith 5 nm. Spectra are scaled to monomer emissions at 379 nm to correct for dilution effects.

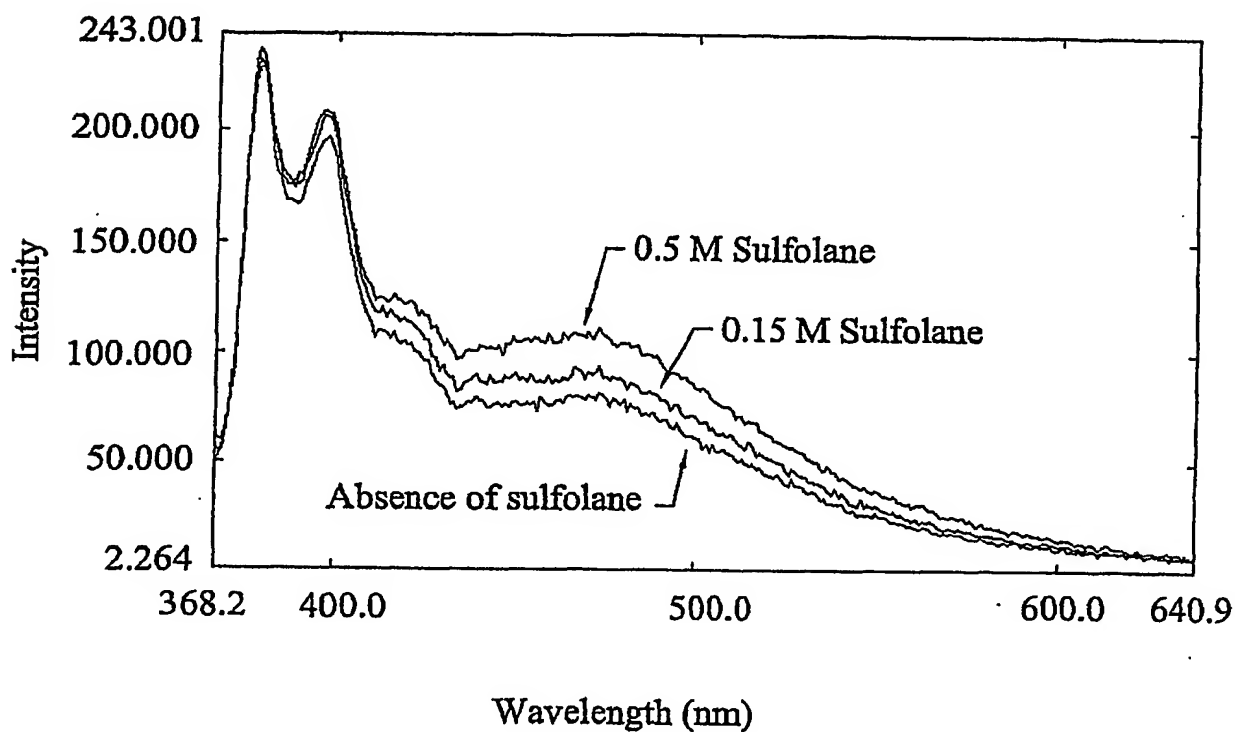


FIG 24

Emission spectra of the SP-19 system in 80% TFE/ Tris buffer (10 mM Tris, 0.1 M NaCl, pH 8.5) at 10 C showing the effect of addition of methylsulfone to give 0.6 and 1.1 M solutions. Excitation wavelength 350 nm; slidwith 5 nm. Spectra are buffer-corrected and scaled to monomer emissions at 379 nm to correct for dilution effects

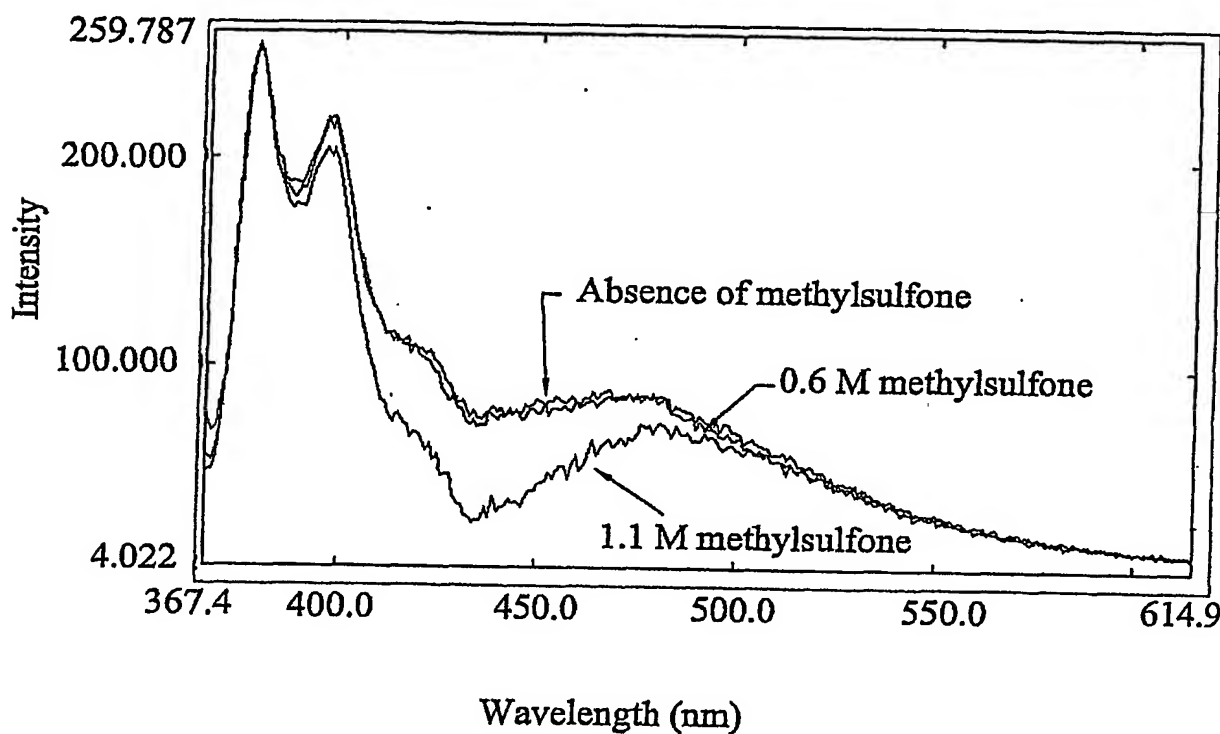


FIG 25

Emission spectra of SP-19 in 80% TFE/ Tris buffer (10 mM Tris, 0.1 M NaCl, pH 8.5) at 10 C showing the effect of the addition of DMSO (to final level of 10%, 1.41 M). Excitation wavelength 350 nm, slidwith 5 nm. Spectra are buffer-corrected and scaled to monomer emission at 379 nm correct for dilution effects.

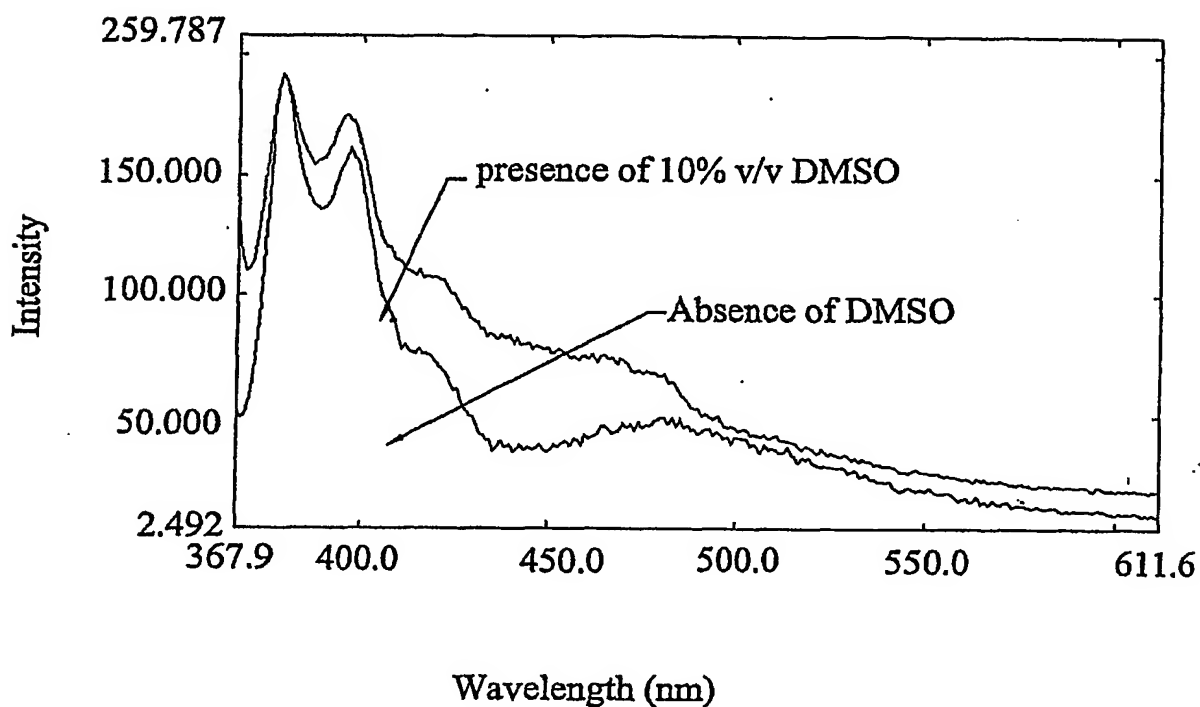


FIG 26

UV/visible absorption spectra of unmodified ON1 and ON1-5'pyrene in 50% v/v acetonitrile at 20°C. The ratio  $A_{260}/A_{345} = 3.2$  refers to Oligo1\_5'pyrene

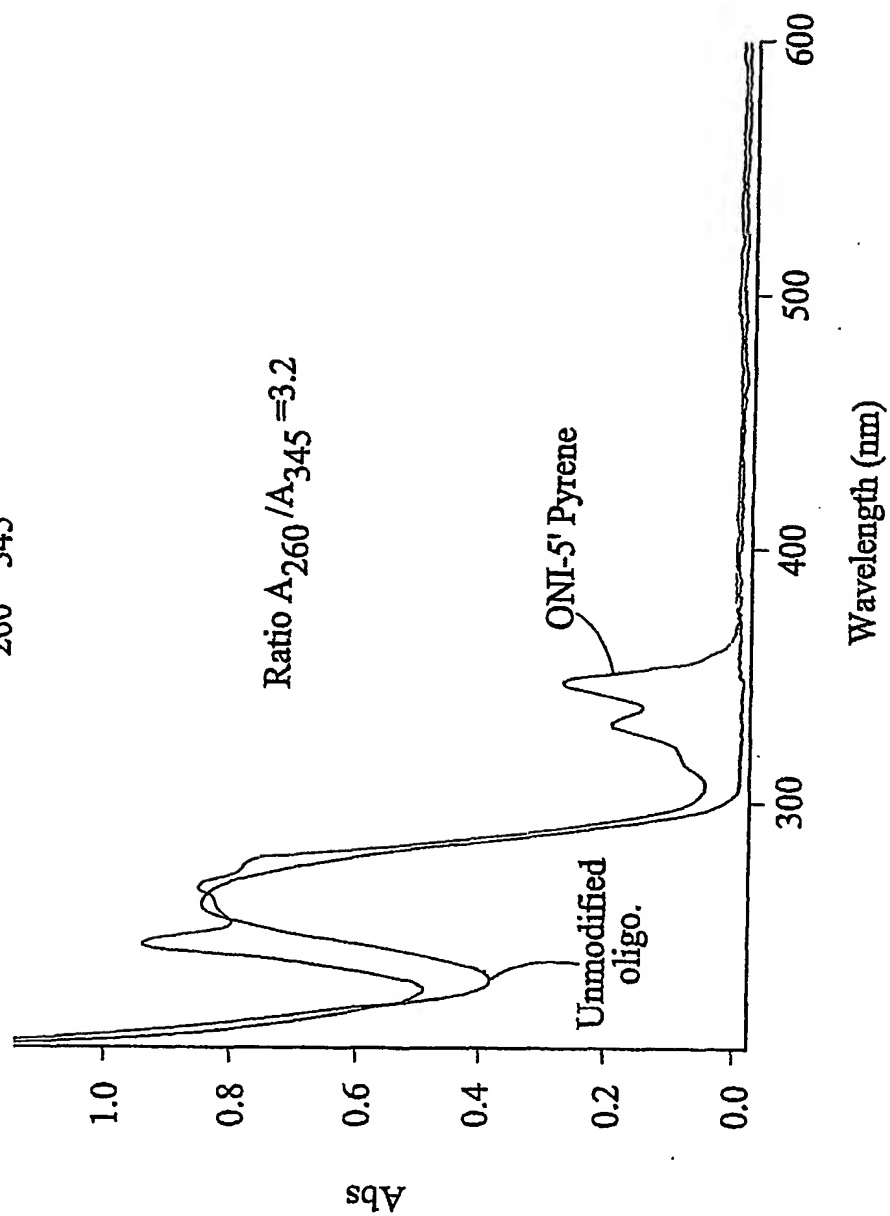


FIG 27

UV/visible absorption spectra of unmodified ON1 and ON1-5'Np in 50% v/v acetonitrile at 20°C.

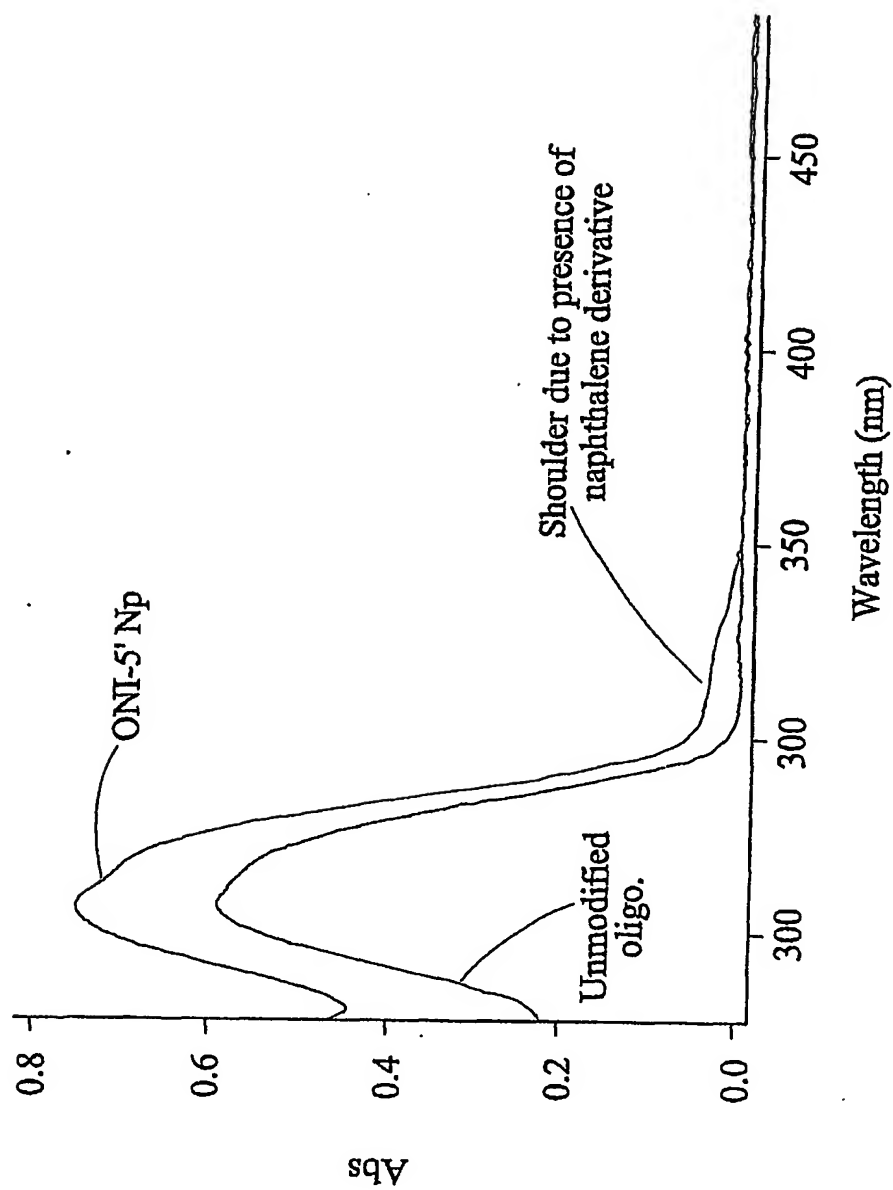


FIG 28



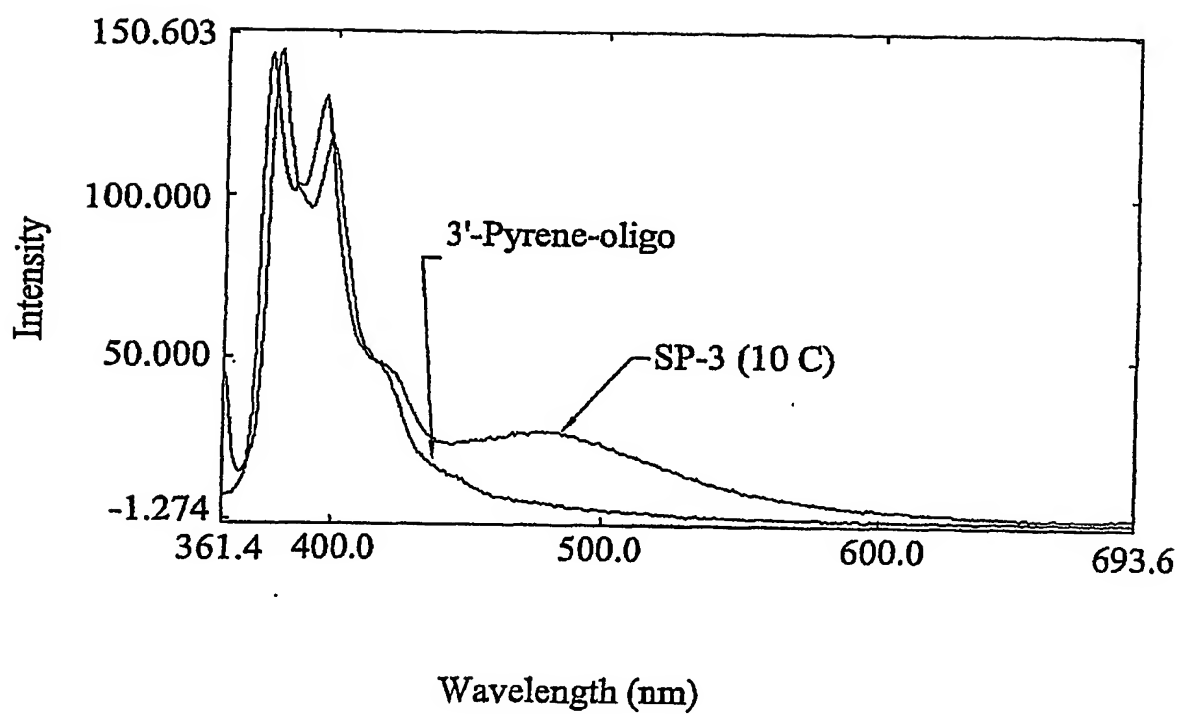
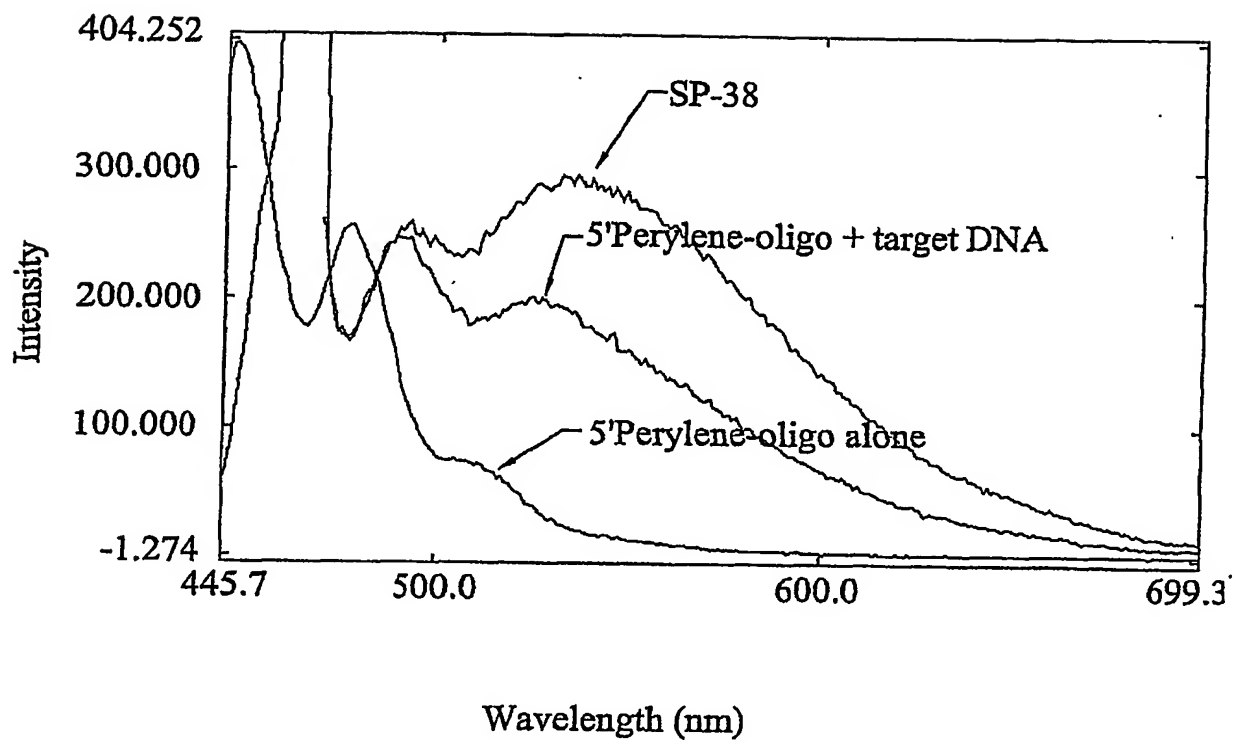
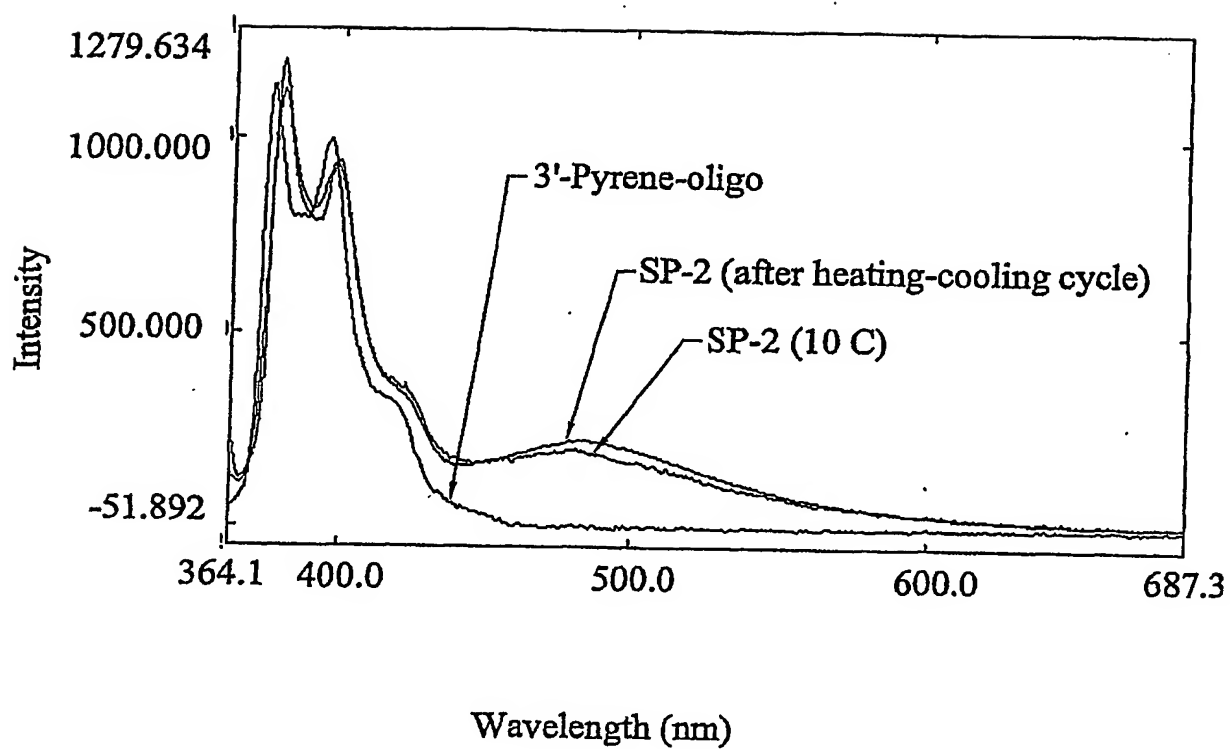
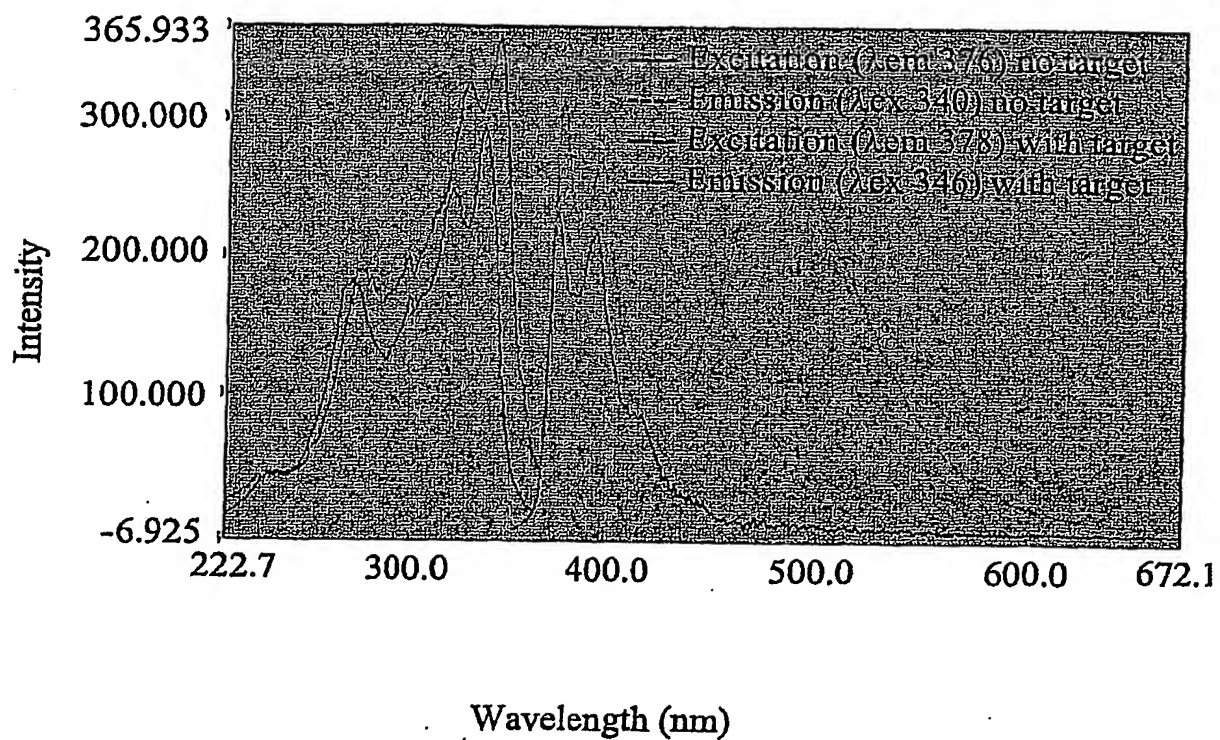
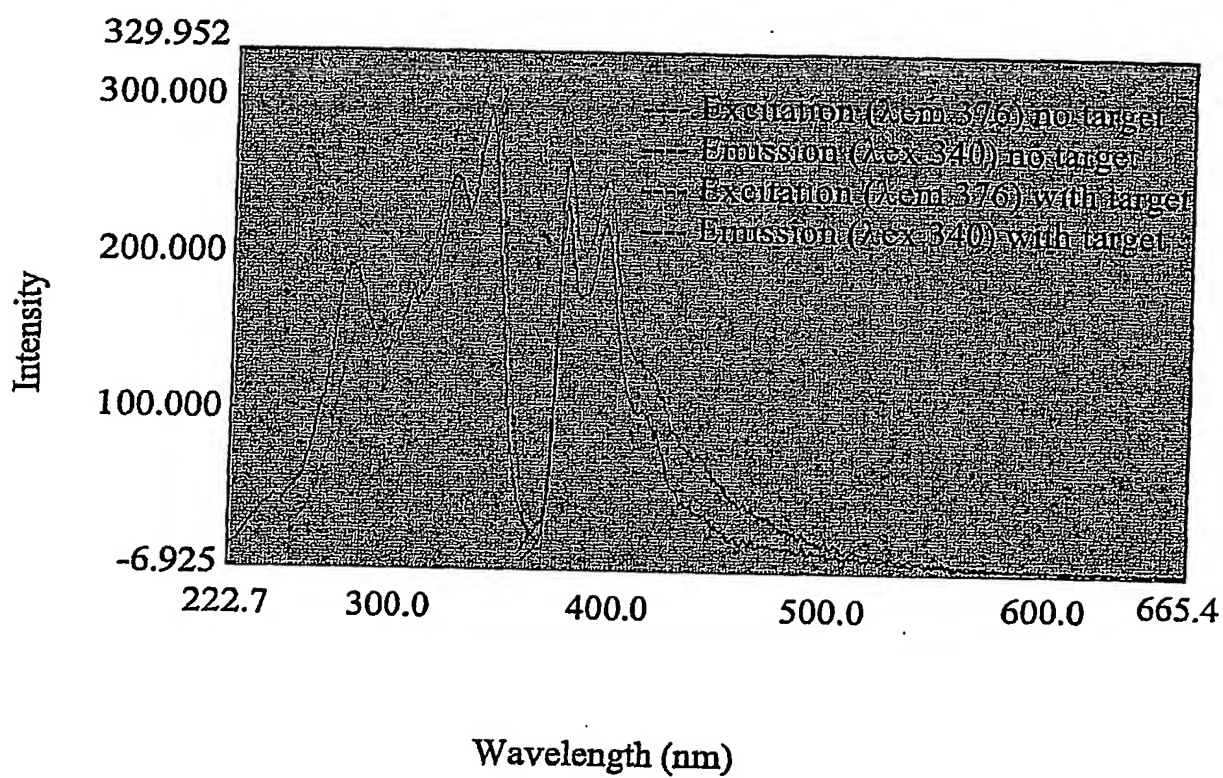


FIG 29

FIG 30

FIG 31

FIG 32

FIG 33